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# LLOYD'S REGISTER OF BRITISH & FOREIGN SHIPPING.

## NOTICE.

ATTENTION IS DIRECTED TO ALTERATIONS AND AMENDMENTS which have been made in the Rules, as follows, viz.—

## WOOD SHIPS-

Section 37, in respect to Salting Keelsons, and Salting on Restoration.

Section 46, in respect to the Quality of Treenails.

Section 54, in respect to Continuation of the A Character.

Sections 56, 57, 59, in respect to Restoration to the A Character.

Section 60, as regards Ships to be classed A in red, and their Survey.

Section 68, as regards Diagonal Doubling of Outside Planking.

Section 82 .- Rule for Foreign Built Ships.

Table A, Jarrah Timber and Rock Maple introduced.

## IRON SHIPS-

Section 7, in respect to Size of Floor Plates. See also Table G 1.

Section 9, in respect to Butt Straps of Keelsons.

Section 19, in respect to Breadth of Sheerstrakes. See also Table G 1.

Section 21, as regards Riveting Main or Middle Deck Sheerstrakes, also Angle Irons connecting Stringer and Intercostal Plates to Outside Plating.

Section 23.—Material for Boundary Planks of Weather Decks, also Riveting of Butts of Iron Deck.

Section 27, in respect to Stop Cocks of Head and Stern Pumps.

Section 31, in respect to Bulwark Stays at Cargo Port.

Section 32, as regards Strengthening to Sheerstrake in way of Side Lights.

Section 41, as regards Thickness of Plating from the Main to Upper Deck Sheerstrake, also Butt Straps of Main Deck Sheerstrakes, and Stringer Plates.

Section 42, as regards Thickness of Plating from Main to Spar Deck, also Butt Straps to Spar and Main Deck Sheerstrakes and Stringer Plates.

Section 44, as regards Strengthening to Upper Deck Stringer Plate and Sheerstrake in way of Break at the Poop.

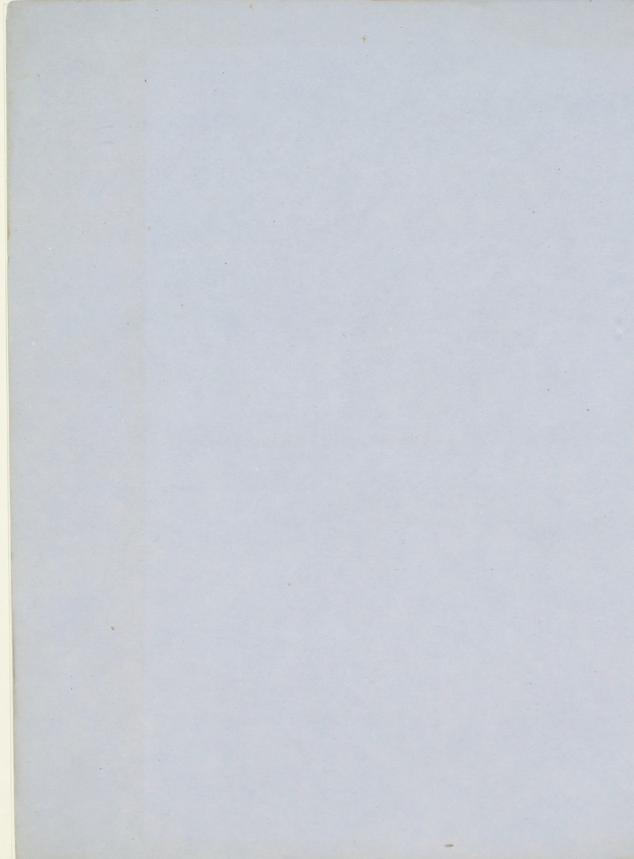
Section 45, as regards Strengthening of Vessels with Raised Quarter Decks at Break of Deck.

Table G 1, as regards Thickness of Plating, &c.

By order of the Committee, GEORGE B. SEYFANG,

2, White Lion Court, Cornhill, E.C. 1st July, 1872.

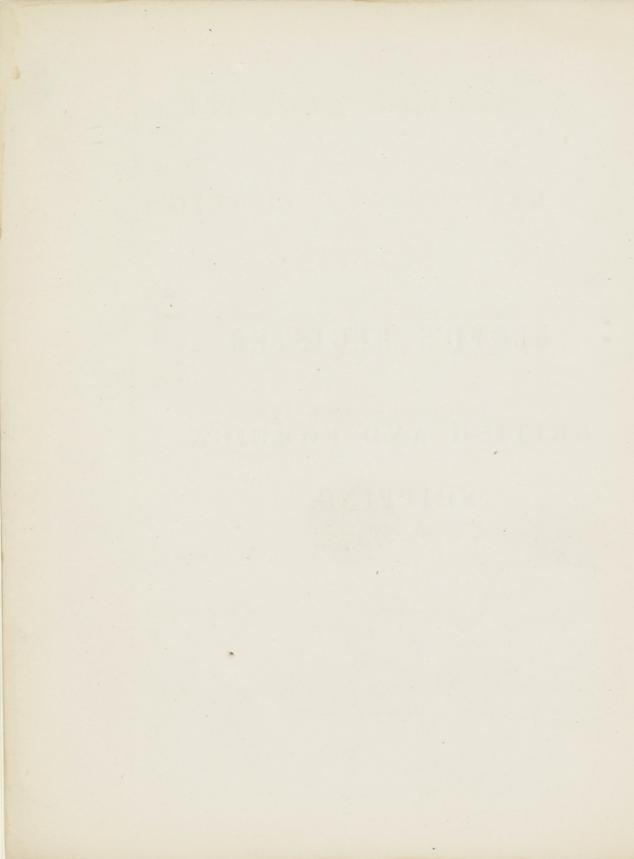
Secretary.



# LLOYD'S REGISTER

OF

# BRITISH AND FOREIGN SHIPPING.



# LLOYD'S REGISTER

OF

# BRITISH AND FOREIGN SHIPPING.

FROM 1ST JULY, 1872, TO THE 30TH JUNE, 1873.

## ESTABLISHED 1834.



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1872.

## TABLE OF CONTENTS OF REGISTER BOOK.

LIST OF THE COMMITTEE.

LIVERPOOL BRANCH.

LIST OF SURVEYORS.

LIST OF SUBSCRIBERS.

INDEX TO THE RULES AND REGULATIONS.

RULES AND REGULATIONS .- WOOD SHIPS.

TABLE A .- MATERIALS ALLOWED FOR SHIPS OF THE SEVERAL GRADES.

TABLES B. C.—DIMENSIONS OF TIMBERS, PLANKING, BEAMS, &c.

TABLES D. E.—SIZES OF BOLTS REQUIRED AND NUMBER OF KNEES REQUIRED.

TABLE F.—DIMENSIONS OF IRON KNEES AND RIDERS FOR BRITISH NORTH AMERICAN BUILT AND FIR SHIPS.

TABLE 22 OF CHAINS AND ANCHORS.

RULES AND REGULATIONS .- IRON SHIPS.

TABLES G. 1, G. 2, G. 3, & G. 4.—DIMENSIONS OF FRAME, PLATING, &c. FOR IRON SHIPS.

TABLES OF SCANTLINGS, &C., OF IRON MASTS.

RULES AND REGULATIONS.—COMPOSITE SHIPS.

FORM OF REPORT OF SURVEY FOR CLASSIFICATION.

FORM OF REPORT FOR IRON SHIPS.

FORM OF REPORT OF ANNUAL SURVEY.

FORM OF CERTIFICATES OF CHARACTER.

FORM OF CERTIFICATE OF MACHINERY FOR VESSELS NAVIGATED BY STEAM.

KEY TO THE REGISTER.

TABLE OF SHIPS CLASSED IN THE REGISTER BOOK.

ALPHABETICAL LISTS OF VESSELS CLASSED.

LIST OF VESSELS CLASSED BUT NOT REGISTERED.

ALPHABETICAL LIST OF ADDITIONAL SHIPS CLASSED.

APPENDIX.

LIST OF THE COMMITTEE OF LLOYD'S.

LIST OF AGENTS TO LLOYD'S.

COPIES.—RESOLUTIONS AMENDING THE RULES, PASSED DURING THE YEAR 1871-72.

NOTICE.—CHARACTERS OF SHIPS CLASSED A IN RED, OR Æ, NOT SURVEYED SINCE 1869, TO BE OMITTED.

COPIES OF CIRCULARS TO SURVEYORS, &c.

TABLE SHOWING THE DATES TO WHICH THE REGISTER BOOK IS POSTED.

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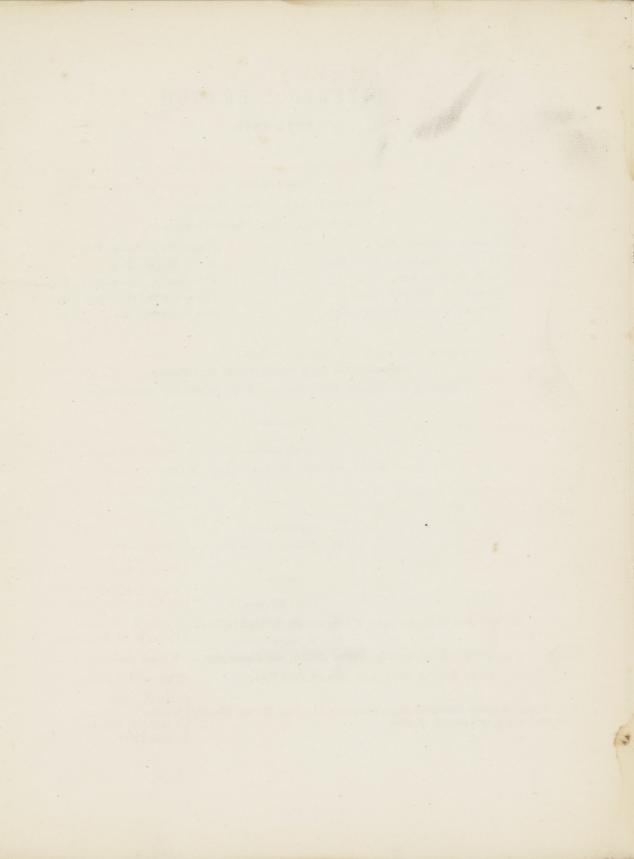
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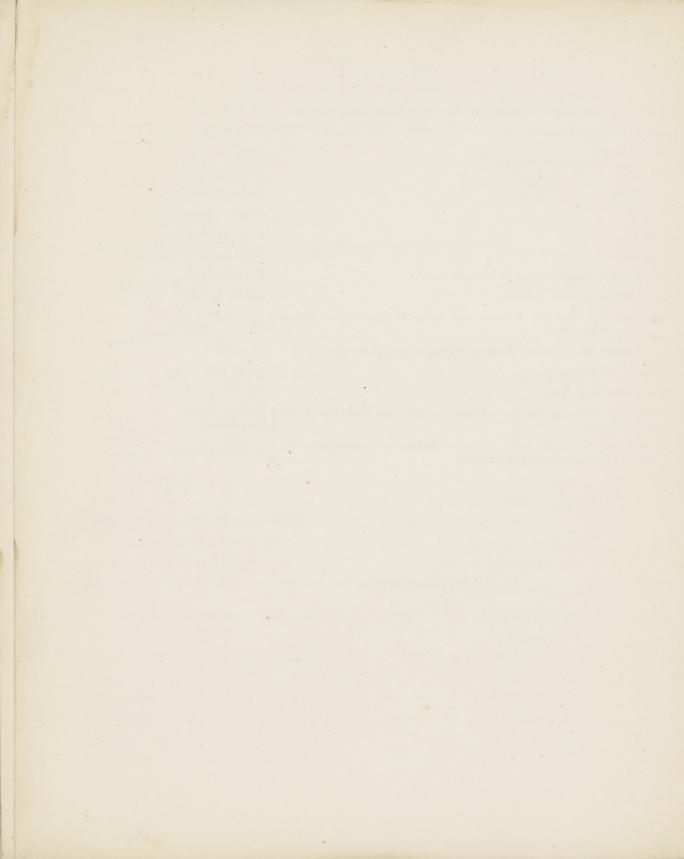
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## SURVEYORS—continued.

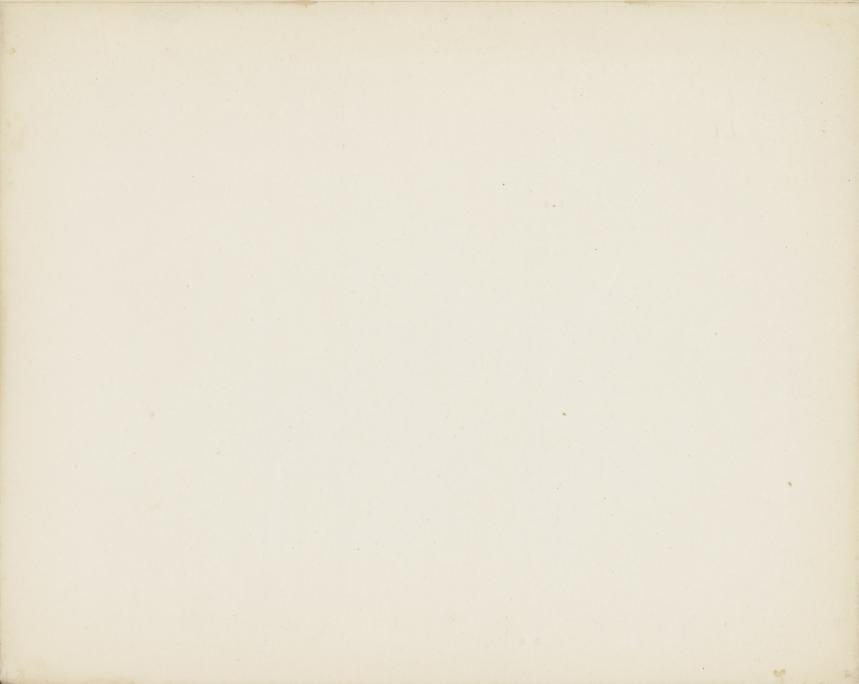
Newcastle, with North and South North Shields)	Shields; also	Blyth, i	vith Har	tley (C	fice, Benjamin Martell. Richard J. Reed. Thomas H. Cooke.
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Portmadoc and Barmouth					William Jones.
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Bergen, Norr	vay									P. G. Halvorsen.
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	with Don	drecht,	Schieda	m, and	surrour	nding pl	aces, al	lso Zeal	and } }	Jan C. W. Loos.
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Shanghai, an										Joseph John Tucker.
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	District	of the	Austro-	Hungar	ian Coa		Venice of	and Anc	ona ?	Ludovico Maffei. Elias Florio.
, 60									ces, }	H. P. Hazewinkel.











## INDEX

TO THE

## RULES AND REGULATIONS.

## 1872-73.

Air courses required in Ships						 		5	Sect. 3	4,	37
Anchors, number and weight,	testing, &c.	. (see T	able No.	22)	,	 			3	2,	72
Appointments vested in the C	ommittee					 		,,,			13
Ballot, all elections to be mad	e by					 					15
Beams, sizes to be regulated by	y their leng	th ami	dships			 	,				40
spruce or yellow pine	, increased s	size				 ,,,		***			40
- iron, in Wood Ships						 					40
deck or hold, spacing	, and how fa	astened				 					41
orlop, for Ships of de						 					41
(see foot-note to						 	after page	40			_
- for third or upper dec						 			3	8,	41
Bilges, how to be secured						 			4	6,	62
Boats, quality and number						 		,,,	7	5,	82
Boilers of Steamers, examinat						 					78
Bolts, description and sizes, T						 	after page	40			46
copper, yellow metal, or		iron				 	**:				46
— in the limber strakes to					1.5	 					46
exceptions to ditto *	9					 					46
— butt and bilge						 					46
—— ditto deficient						 					47
Butts of planking (see Plate a						 					44
timbers						 					37
By-Laws, power to make						 					17
Cables, &c., quality, length, s						 			72, 7	3,	74
chain, Certificate of						 					72
- to be marked		-				 					72
periodical ex						 			3	4,	73
Cant-timbers, stepping of hee						 		,			41
Capstan						 					71
Caulking bottoms of Ships						 			2	8,	67
Ceiling-plank, shifting and fa						 					45
4						 					29
Certificate, form of						 	page 1				
							-				

Characters of Ships, how assigned									Sect	. 18,	31
- definition								31,	60, 61,	64,	66
notice of reduct	tion of									21,	60
- termination of	periods a	assigned									59
Chocks											37
Classification, confirmation of char	racter						,				18
———— Certificates											29
— of Foreign Built S	hips not	built in	accord	ance wi	th the I	Rules		page	40		83
Colonial-built Ships									39, 41,	62,	63
to be consider				d							62
Committee, how constituted											8
Ex-officio Members											8
retirement										9,	10
- vacancies to be filled u	p									9,	10
election of Chairman a	nd Depu	ty Chai	rman								11
											14
- to assign Character										18,	31
Classification, rotation											12
ditto, Chairman											11
Members excluded if in	nterested		)								16
Composite Ships							page	s 79 to	98		_
Continuation of Ships A											54
after re	storation										59
to be la	id on bl	ocks, or	placed	in dry-d	lock						54
to be la exception	on to str	ipping,	when re	cently c	oppered	l					54
Copies of original Reports granted	1									19,	29
Crutch, required for Vessels 150											
Date of Ship's build										33,	
Decks, fastenings, &c										38,	46
—— when worn thin, to be rene							see	Table B			
Double floors, thick strakes to be											39
Doubling of Ships							54,	56, 57,			
built in India											
Dowels required when the heads a			pers are	square							37
Equipment								, 71, 72	, 73, 74	, 75,	76
Fastenings, nature and description											
additional period allow											
knees and riders										41,	
iron or copper										62,	
Ships built in India											70

## INDEX TO RULES AND REGULATIONS.

Fees, table of       27         — special surveys       25, 28         — to Surveyors prohibited       24         Forecastles, topgallant       37, 38, 41         Foreign Built Ships not built in accordance with the Rules       31, 83         Furrens not allowed (see foot-note to Table B, after page 38)       —         Galvanized iron bolts and nails       46         Garboard strakes, thick, how bolted       46         Half-time and periodical Surveys       34         Hatchways and Mast Holes       41         Hawse pipes       71         Iron beams in Wood Ships       40         Iron Ships, rules for the building of       pages 43 to 75         — form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         — Colonial-built, and Fir Ships       62
— to Surveyors prohibited
Forecastles, topgallant
Foreign Built Ships not built in accordance with the Rules  Furrens not allowed (see foot-note to Table B, after page 38)  Galvanized iron bolts and nails  Garboard strakes, thick, how bolted  Half-time and periodical Surveys  Hatchways and Mast Holes  Hawse pipes  Tron beams in Wood Ships  Iron bolts  Iron Ships, rules for the building of  ———————————————————————————————————
Furrens not allowed (see foot-note to Table B, after page 38)       —         Galvanized iron bolts and nails       46         Garboard strakes, thick, how bolted       46         Half-time and periodical Surveys       34         Hatchways and Mast Holes       41         Hawse pipes       71         Iron beams in Wood Ships       40         Iron bolts       62, 69, 70         Iron Ships, rules for the building of       pages 43 to 75         — form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         — Colonial-built, and Fir Ships       62
Galvanized iron bolts and nails       46         Garboard strakes, thick, how bolted       46         Half-time and periodical Surveys       34         Hatchways and Mast Holes       41         Hawse pipes       71         Iron beams in Wood Ships       40         Iron bolts       62, 69, 70         Iron Ships, rules for the building of       pages 43 to 75         — form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         — Colonial-built, and Fir Ships       62
Garboard strakes, thick, how bolted
Garboard strakes, thick, how bolted       46         Half-time and periodical Surveys       34         Hatchways and Mast Holes       41         Hawse pipes       71         Iron beams in Wood Ships       40         Iron bolts       62, 69, 70         Iron Ships, rules for the building of       pages 43 to 75         — form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         — Colonial-built, and Fir Ships       62
Hatchways and Mast Holes
Hatchways and Mast Holes
Iron beams in Wood Ships       40         Iron bolts       62, 69, 70         Iron Ships, rules for the building of       pages 43 to 75         —— form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         —— Colonial-built, and Fir Ships       62
Iron beams in Wood Ships       40         Iron bolts       62, 69, 70         Iron Ships, rules for the building of form for reporting       pages 43 to 75         form for reporting       pages 101 to 104         Keel, rabbets of (foot-note Table B)       after page 40         Knees of Ships (No. and description, Table F)       after page 40         Colonial-built, and Fir Ships       62
Iron bolts        62, 69, 70         Iron Ships, rules for the building of        pages 43 to 75          — form for reporting        pages 101 to 104          Keel, rabbets of (foot-note Table B)        after page 40          Knees of Ships (No. and description, Table F)        after page 40          — Colonial-built, and Fir Ships        62
Ton Simps, these for the building of the build
form for reporting pages 101 to 104 Keel, rabbets of (foot-note Table B) after page 40 Knees of Ships (No. and description, Table F) after page 40 62
Keel, rabbets of (foot-note Table B)after page 40Knees of Ships (No. and description, Table F)after page 40
Knees of Ships (No. and description, Table F)          after page 40        41          Colonial-built, and Fir Ships            62
Colonial-built, and Fir Ships 62
Launching, date of, and when characters lapse foot-note 59
Limber strakes, how bolted
Masts, spars, &c
Materials to be used in Ships classed A in Red 60
Nails or Bolts of copper, yellow metal, or galvanized iron, for decks 46
Orlop beams required for Ships of deep hold 41
Periodical surveys
Planking, quality
to be fastened according to width
distance of the butts
ditto, exceptions
thinner plank at short hoods (see foot-note to Table B, after page 40)
Plates, diagonal, on frames of Ships
Pointers
Poops and forecastles
—— not to exceed three-fifths the length of upper deck
materials to be used
scantlings for
Pumps 71
Quarter decks, raised
Register Books, formerly printed

Register printed annually						 			Sect	2
——— periodically posted						 				6
supplements										7
subscriptions						 			3, 4	
Repairs, notice to be given in						 				22
—— appeal against										00
with inferior or secon						 			56, 58,	
Reports of survey						 				36
						 				19
0 0					***		ges 99 to 1			
Restoration of Ships to A, Fi	ivet male			•••		 Pue			55,	
See See						 			57,	
						 			39,	
Rider Keelsons, how fastened						 				
Riders, iron						 				
for Colonial-built		)S				 			39, 62,	
Rigging, condition				•••		 			71,	
Rudder						 	***			71
materials for (see Tal						 	after page			-
pintles of (see Table						 	after page	40		
Rules, six months' notice of	alteration					 				17
price of a set						 				30
Salting of Ships						 				37
Scantlings of timber, planking	g, beams (see	e Table	B)		***	 	after page	40	38,	39
Scuppers						 				71
Shifts of planking						 	***		39, 44,	62
—— timber ,.						 				42
Ships (A) definition						 				33
limitation of term						 			34,	59
surveys while build	ding					 				35
not built under sur	rvey					 			35, 57,	53
- ditto, to be placed	in dry dock,	or laid	on bloc	eks	***	 				52
- ditto, opening requ	aired for exam	minatio	n			 				52
built not in accord	ance with the	e Rules				 				31
built under a roof						 				48
fastened with part										46
date of launching a						 	foot-not	te		59
proof of place, and	date of build					 				33
India built, fasteni	ngs		produce							70
— built of Iron	8,						see page			_
Foreign built, Classifica							see page		20,	31
20101811 built, Classifica	01011					 	Joo page		~ 0,	-

## INDEX TO RULES AND REGULATIONS.

Ships built of mixed high and low class m	aterials								Sect.	34
— Colonial-built, ditto									20, 62,	63
ditto, to have iron plates (diagonal)			to have	shelves	and wa	terway	s to each	tier		
of beams										39
— ditto, opening for survey, fastenings,								34	, 54, to	63
— Fir										62
— of great length in proportion to the	eir brea	dth or	depth.			olates	(diagonal)	on		
frame, and to have shelves	and wa	terway	s to eac	h tier o	f beams				39,	62
— ditto ditto rider or sister keelsons, &		,,,							39,	62
— ditto ditto breadth of wales										45
										37
— (A) 12 years		•••								50
11 ditto			***							51
10 ditto										52
lower grades			holf tho	torma	oggiorno.	l or ex				34
to be surveyed at periods not e		ig one	nan the							54
continuation on A		• • • •								59
———— ditto, after restoration							***		55,	
——— restoration to A, First rule										
restoration to A, Second rule		***	***							, 58
will be marked expired at end		s assig	ned							
——(A in red) definition										, 60
special survey required										
—— notice of reduction of character										, 60
will be marked expired at end of ter		gned								60
—— Diphthong (Æ) definition										, 61
(E) definition									31	, 64
(I) ditto									31	, 66
Ships' bottoms to be caulked									***	67
Society, Members of the										3
Spar-decked Ships										38
Special surveys on Ships building allowed									25	, 35
									21	, 23
on Ships damaged, &c.										, 28
fees										38
Spirketting of poops									, 80, 81	. 82
Steam Vessels, rules					•••				,,	78
examination of machinery							•••			81
stores							page	106		
form of certificate for ma	chinery				•••	•••				76
Stores, complete, Figure 1										76
——— defective or deficient, Figure 2						• • • •				10

Subscriptions, annual				 	Sect. 3, 4, 5	,
Surveys of Ships, periodical				 	34, 54 to 63, 65, 77	1
——— while building				 	35	,
by an exclusive Officer of the Society				 	34, 35, 51, 54, 60	)
——— by two Surveyors				 	51, 54, 55, 57, 60	)
forms for reporting ditto				 pe	ages 99 to 105 —	-
Surveyors not to class Ships				 	31	1
				 	25, 28	3
to give notice of reduction of characte	er or of	repairs	required	 	21, 22, 60	)
appeal against their requisition				 	23	
prohibited from taking fees for own u				 	24	Ŀ
Tables of scantling of timbers, planking, beams,				 	after <i>page</i> 40 —	
timbering and planking				 	after page 40 —	_
Table of dimensions for Iron Ships				 	after <i>page</i> 75 —	
size, length, &c., of chain cables and we					see page 37 —	_
Timber and space (see Table B)	0			 	after page 40 39	)
Timbers to be well squared, and free from sap				 	34, 37	
—— if not well squared					50	
each set to be framed-bolted together the				••;	07 70	
butts and thickness				 	9.0	
			•••	 	4.0	
inferior or second-hand, in repairs				 		
				 	54, 56, 58, 60	
Tonnage, gross register adopted				 	32	
Tonnage-deck				 	32, 38	
Treenails, quality and make, &c				 	46	
Wales, breadth of				 	45	
Watercourses				 	foot-note 46	
Waterway, faying surface against timbers (see Ta	ble B)			 	after <i>page</i> 40 41	
Inner				 	39, 41	
Workmanship				 	34, 37	1
Windlass				 	71	
——— materials for (see Table A)				 	after page 40 —	-
stripping wood linings for examination				 	34, 54, 56, 58, 60	)

## LLOYD'S REGISTER

OF

## BRITISH AND FOREIGN SHIPPING.

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## RULES AND REGULATIONS.

Section 1. The operations of the Societies of the two Register Books of Shipping formerly printed for the use of Merchants, Ship Owners, and Underwriters, having ceased in the year 1834, this Society was then established for the purpose of obtaining a faithful and accurate Classification of the Mercantile Shipping of the United Kingdom, and of the Foreign Vessels trading thereto, and for the government of which the following Rules and Regulations have been from time to time adopted.

Section 2. A Register Book to be printed annually for the use of Subscribers.

Section 3. Each person subscribing the sum of Three Guineas per annum (or such other sum as the General Committee may fix) to be considered a Member of the Society, and entitled *for his own use* to one copy of the Register Book.

Section 4. The subscription of Public Companies, or Public Establishments (not being engaged in Marine

Insurance), to be Ten Guineas per Annum.

Section 5. The subscription of Marine Insurance Companies to be regulated by the Committee on special application, in each case, but not to be less than Ten Guineas per Annum.

Section 6. The Register Book to be periodically posted throughout the year.

Section 7. For the convenience of Subscribers not resident in London, a Supplement, containing the additions to, and corrections made in, the Register Book, to be printed, fortnightly, in such convenient form, as to admit of its transmission by Post, so that such parties may be furnished, from time to time, with the latest and most complete information.

Section 8. The superintendence of the affairs of the Society to be under the direction of a Committee of Merchants, Ship Owners, and Underwriters: twenty-four elected in London and fifteen at the principal outports, and in addition, the Chairman for managing the affairs of Lloyd's, and the Chairman of the General Ship Owners' Society, for the time being, to be, ex officio, Members of the Committee.

Section 9. Six of the Members elected in London, namely, two of each of the constituent parts of the Committee, to go out annually by rotation, but to be eligible to be re-elected. The vacancies so arising to be filled up by the election of two Underwriters and one Merchant by the Committee of Lloyd's, and two Ship Owners and one Merchant by the Committee of the General Ship Owners' Society.

Section 10. Of the Members elected at the Outports eleven are to retire at the end of every four years, and four of the Members elected at Liverpool are to retire annually. The retiring Members are eligible for re-election.

Section 11. The Committee to appoint from their own body, annually, a Chairman and Deputy-Chairman, and also a Chairman for a Sub-Committee of Classification.

Section 12. The Committee to appoint a Sub-Committee of Classification, to be so regulated that each Member of the General Committee may, in rotation, take his turn of duty therein throughout the year.

Section 13. The Secretary, Clerks, and Servants of the Society, and the Surveyors, to be appointed by and be under the direction of the General Committee.

Section 14. Special meetings to be convened by order of the Chairman, or Deputy-Chairman, or on the requisition of any three Members.

Section 15. All elections and appointments to be made by ballot.

Section 16. No Member of the Committee to be permitted to be present on the decision of the classification of any ship of which he is the owner, or wherein he is directly or indirectly interested.

Section 17. The Committee to be empowered to make such By-laws for their own government and proceedings as they may deem requisite, not being inconsistent with the original Rules and Regulations under which the Society was established; but no new Rule or By-law to be introduced, nor any Rule or By-law altered, without special notice being given for that purpose at the Meeting of the Committee next preceding that at which such Motion is intended to be made; such notice to be inserted in the summons convening the meeting.

No new Rule, or alteration in any existing Rule, materially affecting the classification of ships, to take effect until the expiration of six months from the time it shall have been determined upon.

Section 18. All Reports of survey to be made in writing by the Surveyors according to the forms prescribed, and submitted for the consideration of the General Committee, or of the Sub-Committees of Classification; but the Character assigned by the latter to be subject to confirmation by the General Committee.

Section 19. The reports of the Surveyors, and all documents and proceedings relating to the classification of ships, to be carefully preserved, and parties proving themselves to be interested therein to have access to the same under the direction of the Chairman or Deputy-Chairman.

Copies of the original reports (if the ships be already classed, but not otherwise), so far as relates to the dimensions, scantlings, fastenings, and materials, in cases where the correctness of the reports in these particulars is certified by the builders, are granted on application.

Section 20. Foreign ships, and ships built in the British possessions abroad where there is not a Surveyor (see also Section 51), to be surveyed on their arrival at a port to which a Surveyor has been appointed; but a due regard is to be had to the circumstance of such vessels having been exempted from supervision while building, and the Character to be assigned to them is to be regulated according to their intrinsic quality, and from the best information the Committee can obtain.

Section 21. In every case in which the Character assigned to a ship may be proposed, on survey, to be reduced, notice is to be given in writing to the Owner, Master, or Agent, with an intimation that if the reduction be objected to, the Committee will be ready to direct a special survey, on the Owner, Master, or Agent agreeing to pay the expenses attending the same, provided on the said survey there shall appear sufficient ground for the proposed reduction.

Section 22. When the Surveyors consider repairs to be requisite, they are respectfully to communicate the same in writing to the Owner, Master, or Agent, and if such repairs be not entered upon within a reasonable time, a corresponding report is to be made to the Committee for their decision thereon.

Section 23. Parties considering the repairs suggested by the Surveyor to be unnecessary or unreasonable, may appeal to the Committee, who will direct a special survey to be held; but should the opinion of the Surveyor be confirmed by the Committee, then the expense of such special survey is to be paid by the party appealing.

Section 24. The Surveyors to the Society not to be permitted (without the especial sanction of the Committee), to receive any fee, gratuity, or reward whatsoever for their own use or benefit, for any service

performed by them in their capacity of Surveyors to this Society, on pain of immediate dismissal.

Section 25. The Surveyors will be directed to attend on Special Surveys of ships while building or under damage or repair, when required by Merchants, Ship Owners, or Under-writers; the charge for which is to be regulated according to the nature and extent of the service performed. In all cases, the application for the assistance of the Surveyors must be made in writing addressed to the Secretary.

## FUNDS.

Section 26. The Funds to be under the authority and control of the Committee, and a statement of the Receipts and Expenditure to be annually printed for the information of the subscribers.

Section 27. The following Fees to be charged to the Owners of ships prior to their vessels being classed and registered in the book:—

I.

For Entering and Classing Ships, and for Entering and Classing Ships surveyed for Continuation, or the Character A in Red, or repaired for Restoration.

For each Ship		under 100 Tons		£1 0 0	
Ditto		of 100 Tons and under 200 ,,		2 0 0	
Ditto	- "	200 ,, 300 ,,		3 0 0	
Ditto		300 ,, 400 ,,		4 0 0	
Ditto		400 ,, and upwards		5 0 0	
		II.			
		For Registering Repairs.			
For each Ship		under 300 Tons		£0 10 0	
Ditto		of 300 Tons and under 500 ,,		1 0 0	
Ditto		500 ,, 1,000 ,,	***	2 0 0	

For Re-classing Ships (except when repaired) the Characters of which have been expunged or change of Owners.

and upwards

D		under	200 Tons	£0 10 0
For each Ship			200 ,, and above	1 0 0
Ditto	***	01	200 ,, and above	

1,000

Ditto

## SPECIAL SURVEYS.

Section 28. For ships built under the special superintendence of the Surveyors (to entitle them to the distinctive mark 4), 1s. per ton for the first 1,000 tons, and 6d. per ton for every ton beyond 1,000 tons.

For Surveys for damage, or for other Surveys, held at the request of the Owners, and for the Survey of Ships for Restoration, Continuation, or the character A in Red, a charge (in addition to the Fee for entry) will be made, according to the nature and extent of the service performed.

In cases where the caulking of ships is superintended and tested by the Surveyors, a special charge will be made, according to the tonnage of the ship.

All repairs which may be required on the Surveys above referred to, must be performed under the superintendence of the Society's Surveyors.

MEM.—It is to be understood that in all cases where travelling expenses are incurred by the Surveyors in connection with the above services, they are to be defrayed by the parties interested in the same.

Section 29. Certificates of Character, of the Form No. 7, signed by the Chairman of the General Committee, or by the Chairman of the Sub-Committees of Classification, and countersigned by the Secretary, will be granted on application, the charge for which will be as follows:—

For Ships under 200 Tons	 	£0	2	6	each
Ditto of 200 ,, and above	 	0	5	0	"
Copies of original reports, as per Section 19	 	1	1	0	,,
Section 30. Rules, each copy, 5s.					

### CHARACTERS.

Section 31. The Characters assigned to ships to be, as nearly as possible, a correct indication of their real and intrinsic qualities,\* and to be in all cases fixed (not by the Surveyors, but) by the Committee, after due consideration of the reports of the Surveyors, and such other documents as may be submitted to them, and will be distinguished as follows:—

#### SHIPS A

To consist of new ships, or ships Continued, or Restored. (Vide Sections 34, and 54 to 59.)

## SHIPS A, in Red.

To consist of ships which have passed the period assigned on the original Survey, or Continuation, or Restoration, and of ships not having had an original character, provided they are found on survey of superior description, fit for the conveyance of dry and perishable goods, to and from all parts of the world. (Vide Section 60.)

#### SHIPS Æ.

To consist of ships which are found on Survey fit for the safe conveyance of dry and perishable goods on shorter voyages. (Vide Section 61.)

## SHIPS E.

Will comprise ships which shall be found on Survey fit for the conveyance of cargoes not in their nature subject to sea damage on any voyage. (Vide Section 64.)

#### SHIPS I.

To consist of ships fit to carry cargoes not liable to sea damage on shorter voyages. (Vide Section 66.)

<sup>\*</sup> Ships which are not built in accordance with the principles of the Society's Rules will be marked in the Register Book thus "[Expl. B.S.]," denoting that they are built experimentally, and are classed subject to being surveyed biennially.

## FOREIGN BUILT SHIPS.

Foreign Built Ships which have not been constructed in accordance with the Rules, and have not been surveyed by the Surveyors to this Society while building, may upon survey (see Sec. 83) be assigned one of the three following designations of condition or character, thus, 1 F,—2 F,—3 F, if found eligible thereto.

It is to be distinctly understood that the following characters will be confined in their application to Foreign Built Ships.

## SHIPS 1 F.

1 F denotes ships which are found on survey to be of a superior description, fit for the conveyance of dry and perishable goods to and from all parts of the world.

### SHIPS 2 F.

2 F denotes ships which, although not equal to the foregoing, are nevertheless found on survey to be in a good and efficient condition, and fit for the conveyance of dry and perishable goods, on shorter voyages.

## SHIPS 3 F.

3 F denotes ships which shall be found on survey fit for the conveyance of cargoes not in their nature subject to sea damage.

## EQUIPMENT.

To entitle sailing ships to the Figure 1 for equipment, Sections 71 to 76 must be conformed to, and stores supplied in accordance with Table 22, attached to the Rules.

For steam vessels see Sections 81 and 82.

# TONNAGE FOR REGULATING THE SCANTLINGS AND EQUIPMENT OF WOOD AND COMPOSITE VESSELS.

Section 32. In flush-decked vessels having either one, two, or three decks (not being spar or awning-decked), the tonnage under the upper deck, without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels, is to regulate all the scantlings of the hull, and also the equipment of the vessel.

In vessels having a raised quarter deck, or a poop, or top-gallant forecastle, or deck houses, or awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull, but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, with the addition of the tonnage of the space required for propelling power, is to regulate the equipment.

But in vessels where the tonnage of the erections above the tonnage deck is less than that allowed for crew space, then the difference between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment.

## RULES FOR CLASSIFICATION.

## SHIPS A.

Section 33. Will consist of new ships, and ships which have not passed a prescribed age, and also those which have a Continuation or Restoration of that character, provided they are kept in a state of complete repair and efficiency.

The Character A will not be granted to any vessel, unless satisfactory evidence of the date, build and

place where built is produced.

Section 34. The number of years to be assigned for Character A is to be determined with reference to the original construction and quality of the vessels, the materials employed, and the mode of building; and their continuance for the time so assigned to depend upon its being shown by occasional surveys (annually, if practicable) that their efficiency is duly maintained.

Defects in workmanship or quality of timber will involve a reduction of class, to be determined by the

Committee in each case.

## HALF-TIME OR INTERMEDIATE SURVEY.

The Characters of ships classed A, or A in Red, will be struck out of the Register Book unless they be submitted to the following intermediate survey, within periods not exceeding *four* years in the case of vessels classed eight years and under, either originally, or on Continuation, or on Restoration, and within periods not exceeding half that assigned in vessels classed for longer terms.

The survey will be noted in the Register Book thus,—"H. T." (half-time), with the date of the survey affixed.

#### SURVEY.

The ship to be placed on blocks in dry dock, or on ways, so that the keel and bottom may be seen and properly examined (unless she has been thus surveyed by the Society's officers within the previous twelve months); the hold to be cleared, and proper stages made both inside and outside; the limbers, and all air courses to be cleared; and if the ship has not already got the air courses, described in Rule, Section 37, they are now to be made; the outside planking to be scraped bright where the Surveyors may consider it to be necessary from any apparent defect; bolts of lower deck (if of iron) in number not less than six on each side, and treenails in number not less than twelve on each side, to be driven out at various parts of the ship.

The attention of the Surveyors is to be then particularly directed to the state of the upper or main deck and comings, the upper and lower deck bolts, whether of iron or copper, and the outside planks through which they pass, and to all other parts of the ship, so far as they can be examined.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The windlass to be unhung and its wood lining stripped; the condition of the caulking is also to be ascertained.

The cables to be removed from the lockers and ranged, and, with the anchors and general equipment, examined so as to be satisfactorily reported upon.

## SHIPS BUILT WITH MIXED TIMBER MATERIALS.

Ships, built with Mixed Timber Materials below the fourteen years' grade, of superior workmanship, and in which high class materials and extra fastenings have been judiciously employed to such an extent as to satisfy the Committee, may be allowed a period of original designation exceeding that to which the material of the lowest class used would otherwise entitle them, such additional period not to exceed two years.

Builders seeking this advantage must, in the first instance, submit for the Committee's approval, a drawing of the midship section, with full details of construction and of the proposed materials and scantlings, through the resident Surveyor, who is to state to the Committee his opinion thereon, and the ship must be built under special survey.

No Vessel already built, however, can have the advantage of the above rule, except a Special Survey

be held on her to determine her claims thereto.

The highest (unless of a very limited quantity) and the lowest grade timber materials used in the construction of such Ships will be inserted in the Register Book.

#### SURVEYS WHILE BUILDING.

#### SPECIAL SURVEY.\*

Section 35. The Surveyors are to examine, during the progress of a vessel, the materials and work-manship, from the laying of the keel to her completion; and to point out as early as possible anything that may be objectionable.

#### NOT UNDER SPECIAL SURVEY.

New ships not building under Special Survey are to be surveyed by the Surveyors to this Society, in the following three stages of their progress, or they will be liable to lose one year of the period to which they might otherwise be entitled. (See Section 53.)

First,—When the Frame is completed, timbers dubbed fair inside and outside ready to receive planking

and before any planking is wrought.

Second.—When the Beams are put in, but before the Decks are laid, and with at least two strakes of the plank of the ceiling between the lower deck and the bilge unwrought, to admit of an examination of the inner surface of the plank of the bottom.

Third.—When the Hull is completed, and before the plank is painted or payed.

All Ships for which a higher character than Ten Years A may be claimed, must be surveyed by an exclusive Officer of the Society, twice at least while building; namely, at the first and at the second stages of their progress as above prescribed. Due notice must be given by the Builder or Owner of their being ready for these surveys.

Section 36. A full statement, of the dimensions, scantlings, &c., of all New Ships, verified by the Builder, is to be transmitted by the Surveyor, on a Form similar to No. 4 (*Vide* page 99), which is to be kept as a record in the office of the Society.

<sup>\*</sup> This will entitle the ship to the distinctive mark 🛧

#### RULES TO BE OBSERVED IN BUILDING SHIPS.

Section 37. The whole of the timber is to be of good quality and properly seasoned, of the descriptions shown in Table A, as applicable to the several terms of years for which ships may respectively be appointed to remain on the Character A.

In ships claiming to stand Twelve or Fourteen years from their timber materials, the stem, sternpost, beams, transoms, apron, knightheads, and keelsons, are to be entirely free from sap and from all defects. The rest of the frame to be well squared and free from sap.

#### SALTING.

One year will be added to the term of classification to which a ship may otherwise be entitled, provided that during her construction, or during repair under the Second Rule for Restoration, she be salted as under, viz.:—

The spaces between the transoms and between the timbers of the frame to be filled with salt at each end of the vessel for one-fifth her length, from the deadwood to the gunwale, and amidships from the upper part of the bilges to the gunwale. For the purpose of retaining the salt between the timbers, stops are to be introduced immediately above all the air courses and at the upper part of the bilges.

The keelson is also to be cased in and salted, all fore and aft. In the case, however, of vessels entitled in other respects, from their wood materials, to a class not higher than 10 A, where the keelson is composed of the materials named in lines Nos. 1 and 2 of Table A, it will not be necessary to salt the keelson, except at the ends.

The beams on which the weather-deck is to be laid, if salted, are to have a groove gouged on their upper side, except at their extreme ends; the groove to be in width not less than one-fourth the siding of the beam, and one inch in depth, and to be filled with salt as the deck is being laid; but, if not so salted, the beams, when of wood of the nine years' grade and under, of all ships to which a year has been or may be granted for "Salting" must, on the occasion of Half-time Survey, be exposed for examination by the removal of deck planking to the extent of one strake all fore and If at each side of the ship, or to the satisfaction of the Surveyor.

The state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time and other Special Surveys, and, if necessary, the salt is to be renewed.

Mem.—The foregoing Rule is not to apply to ships built entirely of Teak.

#### WORKMANSHIP.

The workmanship in vessels is to be well executed, and equally so for all grades.

Each set of timbers to be frame-bolted together throughout their entire length; the butts of the timbers to be close, and not to be less than one-third of the entire moulding at that place.

In *all* ships building for classification, where the heads and heels are not full moulded, the timbers are to be well cross chocked with a proper butt at each end of the chock, each arm to be not less in length than once and a half the moulding of the timbers they connect; in all cases the chocks are to be of a description of wood equal to the best material required by the Rules for the timbers which they unite, excepting the floorhead chocks, which may be of the materials allowed by the Rules for first futtocks.

Where the timbers are scarphed, the scarphs to be of proper length and with a butt at each end, and in cases where the heads and heels of the timbers which come together are full moulded, a dowel (to be of the diameter from one-fourth to one-third of the moulding of the timber) must be introduced into the ends of such timbers in order to connect them.

#### AIR COURSES.

In all ships an air-course must be left all fore and aft either immediately below, or one strake below, the clamps of each tier of beams; and in addition, one or two tiers of air-courses must be left in the hold, between the keelson and hold beam clamp, for one-fifth the entire length of the ship at each end.

#### POOPS AND FORECASTLES.

**Section 38.** In the construction of top-gallant forecastles, and poops, the timbers must be of the same materials as are required by Table A for the top-timbers of the frames of ships according to the several terms of years appointed for such ships to remain on the Character A, all the said timbers to extend to the planksheer.

All the outside planking of top-gallant forecastles, and the sheerstrakes, planksheers, and spirketting of top-gallant forecastles and poops must be of the materials required by Table A for the topsides of the ship; and the shelf and clamps of poops and top-gallant forecastles may be of the same quality as those allowed in Table A for the shelf and clamp of the upper deck.

All the beams of top-gallant forecastles, and the mast beams, breast beams, and transom beams of poops, to be of the materials required by Table A for the beams of the ship; the remainder of the beams and the waterway of the poops, and the remainder of the planking of poops and top-gallant forecastles may be of cedar, mahogany, Baltic or American red pine, pitch pine, larch, hackmatack, tamarac, or cowdie, and rock-elm for such remainder of beams only, and yellow pine or American white spruce in ships below the seven years' grade.

In the inside and outside planking, waterways, planksheers, and flat of deck of full poops\* and top-gallant forecastles, a reduction of *one-fourth* from the thickness required by the Table B for such planks in the range of the upper deck in ships with two decks, will be allowed; and in the siding and moulding of the top timbers and beams of full poops and top-gallant forecastles, a reduction of *one-fifth* will be allowed.

The united lengths of poop and forecastle are not to exceed three-fifths of the entire length of the upper deck.

#### RAISED QUARTER-DECKS.

The materials required for the construction of raised quarter-decks to be of the same quality as those named in Table  $\Lambda$  for the main body of the ship.

In the inside and outside planking, waterways, planksheers, and flat of deck of raised quarter-decks, a reduction of *one-fifth* from the thickness required by the Table B for such parts in the range of the upper deck in ships with two decks, will be allowed.

<sup>\*</sup> Parties desirous of making any alteration in the construction of *Poops*, with a view to diminishing the weight (but preserving The requisite strength), may submit their plans for the Committee's consideration and approval.

#### SPAR DECKS.

In vessels having three decks or tiers of beams, where the space under the upper deck is to be used only for the accommodation of crew and passengers, or to enclose the engine openings of steam vessels, the scantlings are to be regulated as per Section 32.

The total depth of hold in spar decked ships must not exceed thirteen-sixteenths, nor be less than twelve-sixteenths of the ship's extreme breadth.

In the construction of spar decks, the timbers must be of the same materials as are required by Table A for the top timbers of the frames of ships according to the several terms of years appointed for such ships to remain on the Character A:

If all the said timbers extend to the planksheer, their siding and moulding may be reduced one-fourth at their heads; but if only the alternate timbers run up to the top height, then a reduction of one-fourth only will be allowed in their moulding at their heads, and in that case there must be a perfect covering board worked all round the ship at the middle deck; and in all cases the middle deck must be a complete deck laid and caulked.

All the outside planking, and the sheerstrakes, planksheers, and spirketting must be of the materials required by Table A for the topsides of the ship; and the shelf and clamp may be of the same quality as those allowed in Table A for the shelf and clamp of the middle deck.

All the beams before the foremast, and the mast beams, hatch beams, and transom beam, must be of the materials required by Table  $\Lambda$  for the beams of the ship; and the remainder of the beams and the waterways of spar deck, and the remainder of the planking, may be of red cedar, mahogany, Baltie or American red pine, pitch pine, larch, hackmatack, tamarac, or cowdie; and in ships below the seven years' grade, the same may be of yellow pine, American white spruce, or white cedar.

In spar decks there may be a diminution of *one-fourth* from the dimensions, fastenings, and bolts prescribed in the tables for the upper deck of ships with two decks (except in the siding of the spar deck beams); but if the outside planking be of either 12 or 14 years' wood then a reduction of *one-third* may be made in the thickness from that prescribed in Table B for the main sheerstrakes of such vessels.

Deckhouses or other erections are allowed on spar decks, but only to the extent of one-tenth of the total superficial area of the spar deck, and are not to exceed seven feet in height. They are not to be placed nearer to either of the ends than one-fifth of the entire length of the vessel.

Vessels to which this rule applies, as regards an entire spar deck, will be noted in the Register Book thus—"Spar decked."

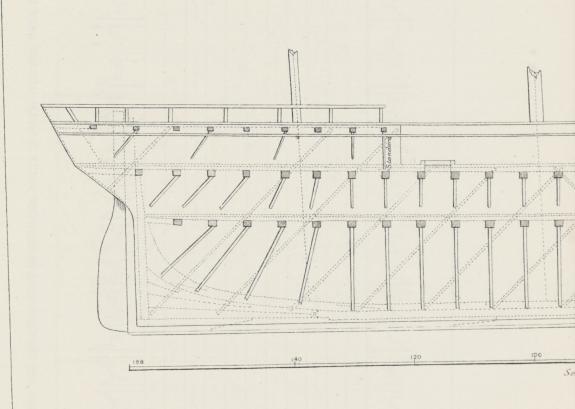
#### THREE-DECKED SHIPS.

All dimensions, fastenings, and bolts of the middle deck in vessels having three decks (viz., upper, middle, and lower deck), to be the same as those prescribed in the Tables for the upper deck of ships having only two decks; and a reduction of one-sixth from the dimensions, fastenings, and bolts prescribed in the Tables for the upper deck of vessels having only two (viz., upper and lower deck), will be allowed in the third or upper deck. The middle deck to be a complete deck, laid and caulked.

## LLOYD'S REGISTER OF BRI

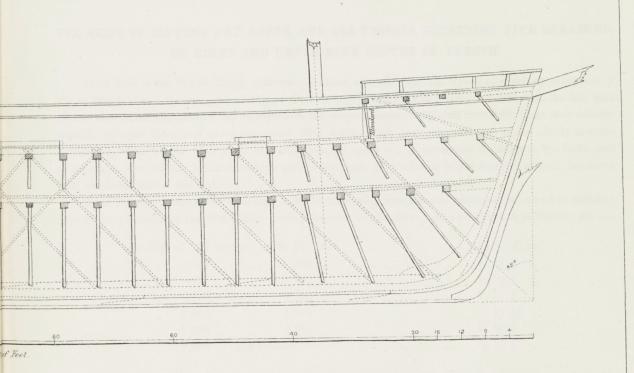
A plan shewing the direction of the From .

prescribed in the



## ISH AND FOREIGN SHIPPING.

Pates on Frames, and Iron Knees and Riders. Pules. Sections 39 and 62.



The number of plates to be in proportion of not less than one pair to every twelve feet of the ship's entire length taken as above, but not to be more than eight feet asunder measured on a square; the said plates are to be placed diagonally, at an angle of not less than 45 degrees, their lower ends pointing to the after end of the keel in the after body, and to the fore end of the keel in the fore body, four pairs crossing each other amidships.

All such ships are to have shelves and waterways to each tier of beams, each equal in contents to the transverse sectional area of the beams at their respective ends, as given in Table C. The breadth or faying surface of shelves and waterways to the beams must not be less than the siding given for the beams of the several decks.

The shelves and waterways are to have the beam ends either dowelled or dovetailed to them, and they are to be properly shifted and scarphed; if fastened with copper or yellow metal, to be bolted through the outside planking at every timber with bolts of the sizes given in Table D. The upper deck binding bolts in all cases to be driven through the outside planking.

When the bolts of the hold or lower deck waterway, shelf, spirketting, or clamp, are of *iron*, they may be driven through and clenched on the timbers of the frame, or from the frame and clenched on the waterway, shelf, spirketting or clamp.

A hanging knee to be also fitted to the lower side of every beam end. In such cases lodging knees may

be dispensed with, except in the mast rooms.

In addition, vessels of 200 tons and above are to have an *inner waterway* fitted on the beams of the upper deck, to extend amidships for about three-fourths the vessel's length. It may be composed of East India teak, pitch pine, larch, hackmatack, Dantzic, Memel, Riga, or American red pine, for vessels of any class.

The breadth of the inner waterway amidships is to be not less than the siding required for the beams, but it may be reduced in breadth at its extreme ends, and the thickness above the beams is to be not less than once and a half the thickness required by Table B for Flat of Deck. The inner waterway is to be in and out through bolted at alternate timbers; and if its breadth shall exceed six inches, it is to have two vertical through bolts in each beam end.

The shifts of inside and outside planking are not to be less than 6 feet, unless there be a strake wrought between them, and then a distance of 5 feet will be allowed.

# VESSELS EXCEEDING SIX BREADTHS OR NINE AND UNDER TEN DEPTHS IN LENGTH.

In vessels the length of which shall exceed six times their extreme breadth, or nine times and under ten times their depth, the number of plates must be not less than one pair to every ten feet of the ship's entire length taken as above, but not to be more than six feet asunder measured on a square, and to be placed diagonally as before described in this Section.\*

<sup>\*</sup> In cases where the length of the ship exceeds ten times the depth, the Builders or Owners are to submit, through the resident Surveyor, for the Committee's approval, their plans for giving the vessel the necessary strength longitudinally.

And in addition to the requirements for ships of five times their breadth in length such ships must be fitted with a rider keelson, or a pair of sister keelsons, at the option of the Owner, the transverse sectional area of such rider keelson or sister keelsons each to be equal to two-thirds of that required in Table B for main keelsons.

If a rider keelson be adopted it is to be fastened with a through bolt (of the size required in Table D for keelson bolts), in every frame; or if the Owner prefers it, every intermediate bolt may be short, passing only through the main and rider keelsons.\*

If sister keelsons be fitted, they must be fastened with through bolts, in number not less than one in every alternate timber, and of the size required in Table D for "scarphs of keels," &c.

#### BEAMS.

Section 40. The sizes of the deck and hold beams have been regulated so as to be determined by the length of the beams amidships, as shown in Table C. The beams will be required to be of the size of the midship beam, except those at the after end of the ship, which may be reduced in proportion to their length.

If beams of spruce or yellow pine are used, the siding of such beams shall be one-fourth larger than is prescribed by the above Table, or be increased each way, siding and moulding, equal in area to that amount.

#### IRON BEAMS.

In cases where Iron Beams are fitted in Wood Ships the beams of the upper deck are to be one-sixteenth of an inch thicker than is required by the Rules for ships built of Iron, in consequence of the greater space between; and the lower deck or hold beams are to be one-eighth of the depth deeper, and one-sixteenth of an inch thicker, than the upper deck beams. The spaces between beams of the several decks not to exceed the spaces at present allowed for wood ships, as per Rule, Section 41. Each tier of beams must have stringer plates riveted on their ends, and tie-plates fore and aft, on each side of the hatchways, in accordance with the Rules for Iron Ships, and to be of the dimensions required in Table G, or of strength equal thereto.

Parties are to submit, through the resident Surveyor, their plans for attaching Iron beams to the ship's sides, for the Committee's approval.

Section 41. The beams of all decks to be in number and size, as hereinafter specified, and to be securely fastened to the sides either with lodging-knees of iron or wood, or with a shelf-piece and waterways, as described in Section 39† or with a shelf-piece and knees, or with some other security equal thereto.

<sup>\*</sup> In all cases in which a rider keelson is fitted, it must be fastened as prescribed above, irrespective of the relative dimensions of the ship.

<sup>†</sup> When the shelves and waterways are fitted and bolted as described in Section 39, having also a hanging knee to the lower side of every beam end, then lodging-knees may be dispensed with, except in the mast-rooms. In Ships of 500 tons and under, where lodging-knees properly bolted are applied, the ordinary plank-clamps may be used, but the bolting of them at alternate timbers, as per Table B, cannot be dispensed with.

#### WATERWAYS AND SHELVES.

The depth of waterway required for faying surface against timbers, below the underside of the planksheer, is to be as shown in Table B, to receive in and out bolts at alternate timbers, with alternate through bolts in shelf, and in clamp where there is no shelf.

Where shelves and waterways are fitted, each should equal in contents the transverse sectional area of the beams at their respective ends, as given in Table C. The breadth or faying surface of shelves and waterways to the beams must not be less than the siding given for the beams of the several decks.

A hanging knee to be also fitted to the lower side of every beam end. In such cases lodging knees may be dispensed with, except in the mast rooms.

The shelves and waterways are to have the beam ends either dowelled or dovetailed to them, and they are to be properly shifted and scarphed; if fastened with copper or yellow metal, to be bolted through the outside planking at every timber with bolts of the sizes given in Table D. The upper deck binding bolts in all cases to be driven through the outside planking.

When the bolts of the hold or lower deck waterway, shelf, spirketting, or clamp, are of *iron*, they may be driven through and clenched on the timbers of the frame, or from the frame and clenched on the waterway, shelf, spirketting, or clamp.

All vessels of 200 tons and above to have an inner waterway, as stated in Section 39.

All ships of 150 tons and above to have vertical knees to the Deck beams; and those of 200 tons and above to have vertical knees to the Hold beams, in number as shown in Table E.

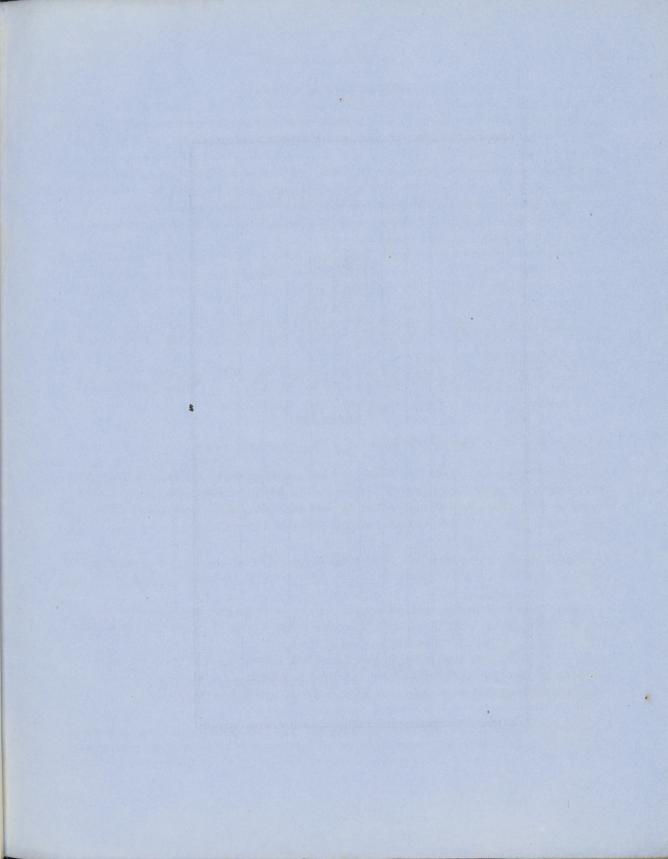
#### DEPTH OF HOLD FOR SPACING OF BEAMS.

In vessels of 13 feet, and under 15 feet depth of hold, the spacing of the hold beams not to exceed 8 feet apart, and the deck beams 4 feet. Vessels of 15 feet and under 18 feet hold, the spacing not to exceed 8 feet and 4 feet apart alternately, or in that proportion; the deck beams to be placed one over every hold beam, and one in all double spaces. Vessels of 18 feet hold and above, the spacing of the beams not to exceed 4 feet 6 inches; the deck beams to be one over every hold beam.

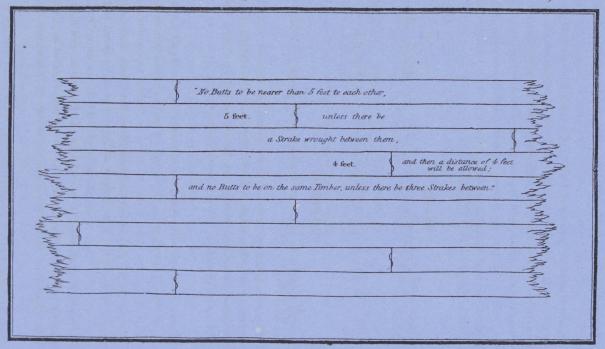
The depth in all such cases to be determined by taking the measure from the top of the limber-strake (the thickness of which, for measurement, to be taken as prescribed in Table B) to the top of the upper deck beams.

Ships having a depth of hold, measured from the limber-strake to the under side of the lower deck beam, above 13 feet but not exceeding 15 feet, must be secured with iron riders of the sizes, and be fastened, as shown in Table F, and in number not less than one on every fourth floor, on each side, from fore side of foremast to aft side of mizen-mast, to extend from the lower deck beams downwards so as to receive not less than two bolts in a substantial part of the floors; or by orlop beams, sufficient in number and properly secured

All ships having two decks (viz. upper and lower deck), and exceeding 24 feet in depth from the top of the limber-strake to the top of the upper deck beams, or having three decks (viz. upper, middle, and lower deck), and exceeding 24 feet in depth from the under side of the MIDDLE DECK, to have orlop beams, the number to be in no case less than one-half the number of lower deck beams in the space between the foremast and the mizenmast, except in the case of flush deck ships, when a depth of 25 feet will be allowed provided in



### SKETCH DESCRIPTIVE OF THE REQUIRED SHIFTING OF PLANK. Section 45. (See also Section 39.)



The Sketch shows the principle on which the Butts should be arranged, so as to avoid Stepping, which is deemed bad Worlamanship.

either case the lower hold does not exceed 15 feet, measured as above from the limber-strakes to the under side of the lower deck beam. Should a house be constructed on such flush deck ship for lodging crew or for store-room, the same not to extend within 10 feet of the stern-post.

The application of this Rule to British North American built ships, and Fir Ships, will not exempt them

from the full operation of the Rule, Section 62.

Every ship exceeding 150 tons to have at least one crutch for the security of the heels of the after timber of the frame; one pair of pointers in addition to a knee at each end of the wing transom to connect the stern frame with the after-body of the ship; and a transom over the heels of the stern timbers properly kneed.

The heels of the cant timbers forward and aft to be stepped into the deadwood and bolted through.

All hatchways and mast holes to be properly framed to receive half beams where necessary, and to have mast partners to each tier of beams, except the orlop beams. The mast holes, skylights, and companions to be properly secured to the satisfaction of the Surveyors.

#### FRAME.

Section 42. All timbers of the frame, including those of the poop and forecastle, to extend to the extreme height.

The shifts of timber in vessels of 200 tons and upwards to be not less than one-seventh of their main breadth; and in ships under 200 tons, to be not less than one-sixth of their main breadth.

#### PLANKING.

Section 43. The outside planking to be of good quality, of the description prescribed in Table A,

to be clear of sap and free from all defects.

The inside planking to be of the description shown in Table A, and free from all foxy, or druxy defects, and decayed knots. With regard to the ceiling plank, and the efficiency of its fastening, it will be required that the planking shall be properly shifted and fastened so that there shall be at least either treenails or through bolts, or short bolts, in each plank of the ceiling in every timber.

Section 44. No butts to be nearer than 5 feet to each other (see Section 39, for vessels exceeding five breadths or eight and under nine depths in length), unless there be a strake wrought between them, and then a distance of 4 feet will be allowed; and no butts to be on the same timber, unless there be three strakes between, as more particularly shown in the diagram annexed (see Plate), but vessels under 200 tons will be exempted from the full operation of this rule; and in ships of larger tonnage a literal compliance with it will be dispensed with in cases wherein it may be satisfactorily proved that the departure from the rule is only partial, being confined to the ends of the ship, or the planking of the topside, and does not injuriously affect the ship's general strength; but such relaxation will not be sanctioned unless an accurate description of the shifting of the plank be transmitted by the Surveyors, to enable the Committee to form a proper judgment on the case.

The thickness of the plank, according to the tonnage of the ship, is not in any instance to be less than is prescribed in Table B.

#### BREADTH OF WALES.

Section 45. The breadth of the wales in every case is to be regulated as under, viz. :-

When the extreme length of the ship, measured from the fore part of the stem to the after part of the stern-post on the range of upper deck, is six times her depth of hold (or less), the wales are to be in breadth 3 in. to every foot of the depth of hold.

When the extreme length of the ship is eight times her depth of hold, the wales are to be in breadth  $3\frac{1}{2}$  in. to every foot of the depth of hold.

When the extreme length of the ship is ten times her depth of hold (or more), the wales are to be in breadth 4 in. to every foot of the depth of hold.

And other intermediate dimensions in these proportions.

#### BILGE PLANKS.

The breadth of the bilge planks to be two-thirds that of the wales.

#### FASTENINGS.

Section 46. Treenails to be of good quality, and of a description equal to the best material through which they pass;\* if, however, in Ships built in the British North American Colonies, or of Fir, treenails be used of materials not inferior to those comprised in line No. 2 in Table A, including Locust and all Australian and tropical hard woods of durable quality, and Beech in the bottom not higher than floor-heads, a notation of "Hard Wood Treenails" will be inserted against the Ship's name in the Register Book.

The Treenails are to be straight and circular, being either engine-turned, compressed, or planed, not graincut or knotty, and must be free from sap and tightly driven, and in all cases the treenails are to be efficiently caulked or wedged outside. In all cases in which planks above eleven inches in width shall be used, they must be double fastened; and those above eight inches in width must be treenailed double and single, except bolts intervene; and if less than that width, then to be treenailed single.

Not less than two-thirds of the treenails are to be driven through the inside planking, clamps, &c.

Every butt in each outside plank to be fastened with two bolts, one of which may be in the adjoining timber, and one to be through and clenched.†

The bilges to be secured with bolts so placed that from the foremast, extending a distance aft equal to three-fifths of the length of the keel, there shall, in ships under 300 tons, be at least one bolt through and clenched in each first futtock; and that in ships of 300 tons and upwards there shall be at least Two bolts through and clenched for each set of timbers in one or other of the thick bilge strakes.

All the bolts of the knees, breasthooks, crutches, riders, transoms, pointers, and keelsons, shelf pieces, waterways, heels of timbers against fore and after deadwood, and of all other material fastenings, are to be driven through and clenched on rings of the same metal as the bolts.

The up and down bolts in the knees to beams are not required to be through the deck, but whether clenched upon the beams, or upon the deck, they must be clenched on rings of the same metal as the bolts.

The two bolts, the nearest to the crowns of the pintles and braces of the rudder are also to be through and clenched, those through the braces to be in the main piece of stern post.

- \* Parties desiring a modification of this requirement must make special application to the Committee in each case.
- † Where thick garboard strakes are used, they must be bolted horizontally through the keel and each other.

and an annual to see the see	Double Fastening in planks above Hinches.	Double & Single Fastening in planks above Sinches & not above II inches.	Single Fastening in planks & inches	
I STORY POWER MANY MANY MANY MANY MANY MANY MANY MANY	10 0110 0110 0110 0110 0110 0110 0110		Man Way   Man Wa	

The limber strakes to be bolted down to the floors, and one bolt in every floor, on each side, if of iron may be clenched on the floors, but if of yellow metal to be through and clenched.\*

When the heels of the first futtocks meet at the middle line on the keel under the keelson (either with full moulding or with butted chocks) the through bolting of the limber strakes may be dispensed with.

When the lower deck or hold beam waterways, shelves, spirkettings, clamps and wood lodging knees, the bilge planks, limber strakes, and wood hooks, crutches and pointers, are fastened with iron, the bolts may be either driven through and clenched on the timbers of the frame, or from the timbers of the frame and clenched inside (if iron lodging knees are fitted and fastened with iron, the bolts must be driven from the inside), provided that the in and out bolts of the hanging knees to the hold or lower deck beams, and those of the knee riders, iron hooks, crutches, or pointers, where such are fitted, are of copper or yellow metal driven through and clenched on the outside plank; and also one bolt in each butt of the bottom planking from the keel to one-fifth the depth of hold below the upper side of the upper deck, and parallel thereto forward and aft, be driven through and clenched on the ceiling, to be of copper or yellow metal, and in addition, all the short bolts within the same range to be of copper or yellow metal.

#### EXTRA PERIOD ALLOWED FOR METAL FASTENINGS.

An additional year will be allowed to all Ships of the A character, either on original Classification or on Restoration under the Second Rule, if fastened externally with treenails, and with copper or yellow metal bolts and dumps, to the exclusion of iron, from the lower part of keel up to the height of one-fifth of the midship depth of hold, below the upper side of the upper deck, and parallel thereto forward and aft, in one, or two, or three decked ships (not being spar decked ships), and below upper side of the main or tonnage deck in spar decked ships, above which all fastenings of every description outside, and the whole of the inside fastenings must be properly galvanized, except the frame bolts, and the bolts in iron straps on timbers, otherwise admitted of iron. All bolts of the lower deck or hold beam waterways, shelf, spirketting, and lodging knees, also the bolts at the bilges and limber strakes, must be driven through and clenched.

And Two Years will be added on original Classification if, in lieu of treenails above the floor heads, the whole of the planking is fastened with bolts of copper, or yellow metal to the above-named height, and above such height with properly galvanized iron bolts.

All inside fastenings hitherto admitted of iron, including all frame bolts, and bolts in iron straps on timbers, or between two thicknesses of outside planking, must also be properly galvanized.

In all cases of ships claiming extra time on the A character, the chain and preventer bolts are to be of properly galvanized iron, but the bolts in heels of timbers abutting against deadwood, forward and aft, must be of copper or yellow metal.

In all such cases of substitution, the bolts, must be in number the same as is already prescribed above for treenails; the proportion of through bolts must be at least two-thirds; and all the through bolts

<sup>\*</sup> Watercourses are to be properly formed at underside of all floors and futtocks at the limbers on each side of middle line, so as to allow water to reach the pumps freely.

<sup>†</sup> Whenever metal fastenings are used in lieu of Treenails, this proportion must be observed.

must be of malleable metal, and clenched on rings (of the same metal) inside. The sizes of the copper or mixed metal bolts must be as under, viz.:—

In ships of	150 tons	and under	200	tons	 	 5in.	181	
	200	ditto	350	"	 	 3 in.	m	ed.
	350	ditto	500	,,	 	 13in.	izes	ns
	500	ditto	700	,,	 	 $\frac{7}{8}$ in.	11.8	be
	700	ditto	900	,,	 	 15in.	alle	not
	900 ,,	and above			 	 lin.	Smaller sizes must	

and the lengths of the short bolts not less than as follows, viz. :-

When used in plank of  $2\frac{1}{2}$  inches, to be 7 inches long

and so on in proportion for plank of other thicknesses. The sizes of the bolts required in the several parts must not be less than is shown in Table D.

Section 47. In every case where the butt bolts are not through and clenched, One Year will be deducted from the period which would otherwise be assigned in the Classification of the vessel.

#### SHIPS BUILT UNDER A ROOF.

Section 48. Ships built under a substantial and efficient roof, kept in good repair, which shall project at each end beyond the length, and on each side beyond the breadth, a quantity equal to half the breadth of the vessel, shall have One Year added to the period prescribed, provided they shall have been surveyed whilst building, and shall have occupied a period of not less than twelve months in their construction, and in which no plank, except as follows, shall have been worked until the expiration of at least three months after the frame was completed, viz.:—not more than three strakes of bilge planks, and two strakes of outside plank in the way of each tier of beams, also the clamps inside, so that the beams may be put in their places.\*

Section 49. The scantlings and dimensions for all sized vessels to be proportionately regulated, agreeably to Table B.

#### SHIPS 11 A.

Section 50. Ships surveyed while building, in which all the materials required for a Twelve Years' Ship shall have been used, and most of the other requisites for that grade fulfilled, but which, from partial deficiencies, may not appear to be in all respects entitled to the full period, although superior to the description of a Ten Years' ship, may be marked in the book thus, 11 A; thereby denoting that they are to remain on that grade Eleven Years, provided they be kept in a state of efficient repair.

<sup>\*</sup> In ships not exceeding 400 tons, a relaxation of the period herein required may be allowed (but not exceeding four months) provided application be made to the Committee, who will appoint a special survey, and who will require a report of the date when the timber was felled, its condition after being sided and moulded and stacked for seasoning, and also when in frame.

#### SHIPS 10 A.

Section 51. Ships surveyed while building, in which every alternate set of timbers are frame-bolted together throughout their entire lengths, and the scantling and shifts of the timbers, the thickness and shifts of the planks, and size of fastenings may be the same as are required by the Rules, and the description of materials prescribed in Table A shall also have been used, but in which the frame is not so well squared as is required for Twelve Years' ships, but which shall be in other respects equal thereto, shall be marked 10 A; thereby denoting that they are to remain on that grade for Ten Years, provided they be kept in a state of efficient repair.

Section 52. In all other cases, ships surveyed while building, and constructed of the materials of good quality, hereinafter shown in Table A, will be allowed the several terms of years respectively appointed, provided they be kept in a state of efficient repair.

#### SHIPS NOT BUILT UNDER SURVEY.

All ships, not built under Survey, whether in the United Kingdom or abroad, for which a character may be claimed, must be placed in dry dock or laid on blocks in order that their bottoms may be seen and properly examined. They will also be required to have their timbers completely exposed for examination, by a plank or listing, as the Surveyor (who must be an exclusive officer of the Society) may direct, being taken out, either inside or outside, all fore and aft, on both sides, equal to one entire strake, at the first futtock heads, and another between decks. A few treenails must likewise be driven out, so that the Surveyors, from actual inspection, may be satisfied whether or not they are of the quality and make prescribed by the Rules; and the same being thus ascertained, shall be reported to the Committee, and a character assigned.

If the ship be 400 tons and upwards, the Survey must be made by two Surveyors, and their report signed accordingly.

Section 53. Ships built in the United Kingdom—or in Quebec; or St. John, New Brunswick; or Miramichi, and Northern Ports of New Brunswick, or in Prince Edward Island, or built in Nova Scotia after 1864—and not surveyed while building by the Surveyors to this Society, and all ships, the Owners or Builders of which may have refused or declined to permit them to be surveyed at the several periods prescribed by the Rules, will have One Year deducted from the period which would otherwise have been assigned, in consequence of their not having been submitted to survey during their construction.

In no case, however, will a higher grade than 10 A be assigned for wood materials to ships built in the United Kingdom which shall not have been surveyed while building.

#### CONTINUATION OF SHIPS A.

**Section 54.** If on the termination of the period of original designation, or if, at any subsequent period not exceeding two-thirds of the number of years assigned originally, or on Restoration (provided the last paragraph, Section 56, and 2nd and 3rd paragraphs, Section 59, be complied with), the Owner should wish to have his ship remain, or be replaced on the letter  $\bigwedge$ , he is to send a written notice thereof to the Secretary, and the Committee shall then direct a special survey, as follows, to be held by not less than two competent persons to be appointed by the Committee, one of them to be a Surveyor, the exclusive officer of the Society.

The period assigned for Continuation will commence from the time the ship may have gone off the letter Λ, without regard to the date when the survey for this purpose may have been held. This period may be either one-third or two-thirds the number of years assigned originally, or on Restoration, if the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with, dependent on which of the following surveys, designated Survey No. 1, and Survey No. 2, be complied with.\*

Ships so Continued, shall be distinguished in the Register Book by the number of years for which the character is extended being inserted separately under the number assigned on the original character, thereby denoting that the ship has been found on survey in such good and efficient order as to entitle her to be continued for — years.

Where such Continuation is assigned, the half-time survey as prescribed in Section 34 is to be held, and the vessel to be subject to an annual survey.

In cases of the repair of ships for Continuation of the  $\Lambda$  Character, materials of a lower grade than those used in the original construction of the ship will be permitted to be used, but they will be noted in the Register Book. Should the materials thus used be not removed on Restoration, the term of Restoration will be reduced, the reduction being regulated by the Mixed Material Rule, Section 34.

#### SURVEY .- No. 1.

The ship must be either placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

To be scraped or dubbed bright, from the light water-mark upwards, including the planksheers and waterways, so as to expose the surface of the plank to view.†

- \* But if during the last year of the period assigned originally, or on Restoration (when the Restoration is of such a character as to allow of Continuation.—See last paragraph of Section 56 and 2nd and 3rd paragraphs of Section 57), the owner of the ship shall, in consequence of her being about to proceed on a distant foreign voyage, apply to have her specially Surveyed for Continuation on the letter A, a Special Survey shall be held conformably with the above Section.
- † If the ship has been sheathed with wood over felt, within a period of five years, and the plank from the light water-mark upwards shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained, and favourably reported upon by the Surveyors; and provided that the sheathing which covers the binding-bolts and raft-ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listings of sheathing cut out at hood ends; and the planking, fastenings, and caulking so exposed, shall prove to be in good condition; then, on application to the Committee, the stripping from the light water-mark upwards, may be dispensed with; but whenever the sheathing is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

If the ship has been sheathed with metal within a period of two years, and it shall appear to the Surveyors that stripping from the light water-mark upwards may be dispensed with, the case will receive due consideration on application to the Committee.

The hold to be cleared, and proper stages to be made both inside and outside.

All air-courses and the limbers to be cleared.

The condition of the timbers of the frame to be further ascertained, by a *new* listing not less than four inches wide being *cut* out of the ceiling at each end of the hold, on each side, between the keelson and aircourse under hold beam clamp, for one-fifth the entire length of the ship.

One treenail to be driven out from every alternate frame or fourth timber, between the upper edge of the wales and planksheers, and one from every alternate frame or fourth timber, between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams, to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

If the fastenings in the range of the lower deck be of iron not through the outside planking, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

All treenails, bolts, and listings, removed for the examination of the vessel's condition to be from such parts as the Surveyors may direct.

Where the middle line bolts are of iron, their condition is to be ascertained; but if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel, in each alternate frame, also through the stem, apron, stempost, and deadwood.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The cables and general equipment to be attended to, as prescribed in Sections 71 to 76.

The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and comings, the upper and lower deck bolts, whether of iron or copper, and the outside planks through which they pass, the planksheers, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breasthooks, sternpost, inner-post, and transoms; the floors, keelsons, and keel; the rudder and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

The ship to be efficiently repaired with suitable materials.

The Surveyors on these points shall transmit to the Committee a detailed report, accompanied by such observations as may occur to them, from inspection of the Ship, or from information of the repairs she may have received. If, from the report of such Special Survey, the Ship shall appear to be in a sound and efficient state, the Committee shall continue such Ship on the letter A, for such further period as they may think fit, not exceeding, however, one-third of the number of years which had been assigned originally, or on Restoration. No Ship, however, can have a continuation of the A Character after Restoration unless the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with.

Ships classed A for a less period than six years, will be allowed a Continuation of two years, provided that, in addition to the above requirements the Owner shall have removed a plank in each buttock.

Ships built in the British North American Colonies will have to comply with the Rules, Section 63.

If, however, at the time of the above Survey, or at any time during the term of Continuation, the ship be diagonally doubled according to Section 68; then, in the case of Ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding 5 and under 12 years' grade will be allowed 3 years additional, and those built of 12 years' materials and upwards, 4 years additional; provided a strake all fore and aft at the upper edge of the doubling, or the planksheer be removed.

#### SURVEY No. 2.

For the purpose of holding such Survey, the ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

All sheathing (wood or metal) to be entirely stripped off the bottom, and elsewhere.\*

All the outside planking from the light water-mark upwards, including the planksheers and waterways, to be scraped or dubbed bright.

The hold to be cleared, and proper stages made both inside and outside.

All air-courses and the limbers to be cleared.

The condition of the timbers of the frame to be further ascertained by the removal of all the treenails in one strake in the top sides fore and aft on each side, and by the removal of two planks on each side above the wales.

In addition, a plank to be removed in each bow and buttock.

One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the topsides and bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

If the whole of the treenails from the light water-mark upwards have to be renewed, the removal of a plank in each bow and buttock will be sufficient, provided the timbers in the treenail holes be examined, and found in good condition.

Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

If the fastenings in the range of the lower deck be of iron, not through the outside planking, one plank

<sup>\*</sup> If the ship has been sheathed with wood over felt, within a period of five years, and the plank shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained and favourably reported upon by the Surveyors, and providing that the sheathing which covers the binding bolts and raft ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listing of sheathing cut out at hood ends; and the planking, fastenings, and caulking so exposed, shall prove to be in good condition, then, on application to the Committee, the stripping of the wood sheathing may be dispensed with; but whenever it is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

Where the middle line bolts are of iron, their condition is to be ascertained; but if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, sternpost, and deadwood.

Plank, or a new listing of ceiling of sufficient breadth (not less than 4 inches wide), at the discretion of the Surveyor, to be cut out of the ceiling in the range of the floor-heads, or at such height as may, in the judgment of the Surveyors, best expose the timbers of the frame to view, at each end of the hold on each side for one-fifth the entire length of the ship, and for the remaining three-fifths of the ship's length, the state of the timbers to be ascertained by driving out a treenail from every fourth timber in one or other of the strakes of bilge planking. If the Ship Owner should prefer it, planking may be removed outside at each end of the ship in the range of the floor-heads.

In order to ascertain the condition of the Upper Deck beam ends, a strake of deck next the waterways on each side to be taken out, except where it is covered by a poop or a forecastle; and where this exception arises, the strake should be removed as far aft as the first beam within the poop, and as far forward as the first beam within the forecastle. On the decks below, as well as on the Upper Deck beyond the above limits, the plank need not be removed, provided the beams be tested by boring and sounding, and be found good.

In British North American built ships and Fir Ships a strake of deck next the waterways on each side is to be taken out.

All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The anchors, cables, and general equipment, to be attended to as prescribed in Sections 71 to 76.

The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and comings, the upper and lower deck bolts, whether of iron or copper, and the outside planks through which they pass; the planksheers, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post, inner-post, and transoms; the floors and keelson; the keel, rudder, and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

The Ship to be efficiently repaired with suitable materials.

The Surveyors on these points shall transmit to the Committee a detailed report, accompanied by such observations as may occur to them, from inspection of the ship, or from information of the repairs she may have received. If, from the report of such Special Survey, the ship shall appear to be in a sound and thoroughly efficient state, the Committee shall Continue such ship on the letter A for such further period as they may think fit, not exceeding, however, two-thirds of the number of years which had been assigned originally, or on Restoration. No Ship, however, can have a Continuation of the A Character after Restoration unless the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with.

If, however, at the time of the above Survey, or at any time during the term of Continuation, the ship be diagonally doubled, and the other requirements be complied with, according to Section 68, then, in case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under 12 years' grade will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional.

If such extended term be given for the doubling, the materials used in the repairs must be equal in grade to those required in the original construction of the ship, or she will be liable to a reduced class, regulated by the Mixed Material Rule, Section 34.

#### RESTORATION OF SHIPS TO THE CHARACTER A.

Section 55. If at any age of a vessel the Owner be desirous to have his ship Restored to the A character, such Restoration will be granted for a period not exceeding one-half of the term originally assigned, the same to be calculated from the date of such repairs; provided that a special survey as hereafter described be held by two Surveyors, one of them to be an exclusive Officer of the Society, and that all repairs found necessary be completed to their satisfaction.

If at the expiration of such Restoration, the Owner be desirous to have his ship again Restored, she must be subjected to the requirements of the second Rule for Restoration.

#### REQUISITES FOR RESTORATION.—FIRST RULE.\*

Section 56. The ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.

All the outside planking from the light water-mark upwards, including the waterways, poop and forecastle planksheers, the stem, knight-heads and hawse-timbers, and the stempost and rudder, where exposed; also the shelves, clamps, hold beams, waterways, all inside planking, and the keelson to be scraped or dubbed bright.

The hold to be cleared, and proper stages made both inside and outside.

All air-courses and the limbers to be cleared. The condition of the timbers of the frame to be further ascertained by the removal of one strake of topside planking all fore and aft on each side.

In addition, a plank to be removed in each bow and buttock.

In all cases the outside planks through which the chain and preventer bolts pass, must be removed.

In flush-decked ships all the planksheer and spirketting to be removed, but in ships having a poop or top-gallant forecastle, it will only be necessary to remove the planksheer and spirketting between these, and the mouldings in continuation of the planksheer forward and aft, or a portion of topside planking extending from the fore part of the poop aft, and from the after part of the top-gallant forecastle forward.

One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the

<sup>\*</sup> In the case of Restoration of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.

wales and the planksheer, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, also one to be driven out from every fourth timber for half the vessel's length amidships on each side at the bilge, and at such other parts of the vessel as the Surveyors may direct, in order that the state of the treenails, and the timbers and planking in the treenail holes, may be ascertained.

Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams, to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

If the fastenings in the range of the lower deck be of *iron not through the outside planking*, one plank on each side is to be removed, so that the condition of these fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through bolted in these parts as the Surveyors may direct.

Where the middle-line bolts are of iron, their condition is to be ascertained; but if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel, in each alternate frame, also through the stem, apron, sternpost, and deadwood.

A strake of ceiling to be removed all fore and aft, in the range of the first futtock heads, or at such height forward and aft as may, in the judgment of the Surveyors, best expose the timbers of the frame and chocks to views.

One plank of ceiling on each side at the floor-heads to be removed.

In order to ascertain the condition of the deck beam ends, a strake of deck next the main or inner waterway to be removed from each tier of beams, excepting that in ships having a poop or a top-gallant forecastle, the upper deck need not be removed abaft the first beam within the poop, or before the first beam within the forecastle; provided the remainder of the upper deck beams under the poop and forecastle be tested by boring and sounding, and be found good.

All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

All yellow metal bolts to be tested, where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The anchors, cables, and general equipment to be attended to as prescribed in Sections 71 to 76.

When in the state above described, the ship is to be submitted to a special survey and examination, at which the attention of the Surveyors is to be particularly directed to the state of the upper or main deck and comings, the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the waterways and beams so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breasthooks, sternpost and transoms; the floors, keelson, and keel; the rudder and all its parts and hangings; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

If, after the above examination, the Owner should consent to take out all planks, timbers, beams, knees, waterways, fastenings, and other parts that may be found defective, or objected to, and replace them with materials of the same species, or of equal quality to that required in vessels of two-thirds the number of years (by their timber material) of the ship's original construction, then such ships to be entitled to be Restored for a period not exceeding one-half the number of years originally assigned.

If, however, in addition to the above, or at any time during the term of Restoration, the ship be diagonally doubled, according to Section 68, then in the case of ships built of the 5 years' grade and under, 2 years additional will be allowed; if built of materials exceeding the 5 and under the 12 years' grade, 3 years additional; and if of 12 years' material, 4 years additional will be allowed.\*

Ships Restored, to be subject to annual survey, and also to a half-time survey, as prescribed in Section 34.

Ships of 300 tons or above, Restored according to the foregoing Rule, will not be allowed a Continuation of the A Character at the expiration of the Restoration, unless they be diagonally doubled as prescribed in Section 68. But if they be under 300 tons, and exceeding 20 years of age, to be allowed a Continuation the bottom planking must either be doubled, as prescribed in Section 68, or else renewed for half the length amidships from the second futtock-heads to the keel, in addition to the other requirements of Section 54.

#### SECOND RULE.

Section 57. If, at any age of a vessel, the owner be desirous to have his ship Restored to the A character for a longer period than one-half her original classification, she must be subjected to the Special Survey hereafter described, to be held by two Surveyors, one of them to be an exclusive Officer of the Society, and all repairs found necessary completed to their satisfaction.

If the vessel be 300 tons or above, she must be diagonally doubled, as per Section 68.

But if she be under 300 tons, and exceeding twenty years of age, she must have the bottom planking renewed for one-half the length amidships from the second futtock-heads to the keel, or be diagonally doubled, as per Section 68.

Vessels which have undergone this rule, will be entitled to be Restored for a period not exceeding two-thirds the number of years originally assigned (exclusive of any period which might have been previously assigned for doubling), and in addition, if the vessel be at this time diagonally doubled, in accordance with the Rules, Section 68, the term prescribed for such doubling will be allowed.†

## REQUISITES FOR RESTORATION .- SECOND RULE. ‡

Section 58. The Ship must be placed in dry dock or laid on blocks upon ways, so that the keel may be examined.

All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.

The hold to be cleared, and proper stages made both inside and outside.

All the outside planking from the lower part of the chocks at floor-heads, upwards, the stem, knight-heads, hawse-timbers, sternpost, and rudder where exposed; also the shelves, clamps, bilge planks, ceiling, and keelsons, to be scraped or dubbed bright.

- \* It is understood, however, that no Ship which has already had a prolonged term for doubling, can again claim on Continuation, or on Restoration.
- † In the case of Restoration of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.
- ‡ If the Vessel be Salted in accordance with Section 37 during repairs under the Second Rule for Restoration, she will be allowed the advantage of the Rule for Salting.

All air-courses and the limbers to be cleared.

The upper deck waterways, spirketting, planksheers, sheerstrakes, and topside planks, through which the upper deck shelf lodging knee and waterway bolts pass, to be removed.

Two planks in each bow and buttock to be removed.

In all cases the outside planks through which the chain and preventer bolts pass, must be removed.

If the bolts in the range of the lower-deck be iron, the outside planks through which they pass must be removed.

One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the planksheer, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, also one to be driven out from every fourth timber, for half the vessel's length amidships on each side at the bilge, and at such other parts of the vessel as the Surveyor may direct, in order that the state of the treenails and the timbers and planking in the treenail holes may be ascertained.

If the fastenings in the range of the lower deck be of *iron*, not through the outside planking, one plank on each side is to be removed, so that the condition of these fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through bolted in these parts as the Surveyors may direct.

Where the middle line bolts are of iron, their condition is to be ascertained, but if this be not practicable, additional bolts of sufficient size, must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, sternpost, and deadwood.

Two strakes of ceiling in the range of the first futtock-heads, and one strake in the range of the floor heads, to be removed on each side all fore and aft.

A strake of upper deck plank next the hatchways to be removed all fore and aft.

A strake of deck next the waterway or spirketting, on the hold or lower deck beams, to be removed.

All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The anchors, cables, and general equipment to be attended to as prescribed in Sections 71 to 76.

When in the state above described, the ship to be submitted to a special survey and examination, at which the attention of the Surveyors is to be particularly directed to the state of the upper deck and comings, the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the beams, stem, apron, hawse-timbers, knight-heads, breasthooks, sternpost, inner-post, and transoms; the floors, keelson and keel; the rudder and all its parts and hangings; the planking outside and inside and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

If, after the above examination, the Owner should consent to take out all planks, timbers, beams, knees, fastenings, and other parts that may be found defective, or objected to, and replace them with materials of the same species, or of equal quality with those of which the ship was originally constructed (if lower grade material be used, she will be liable to a reduced class, regulated by the Mixed Material Rule, Section 34), and she be diagonally doubled as per Section 68, then she will be entitled to be Restored for a period not

exceeding two-thirds the number of years assigned originally, and the term allowed for doubling, viz., 2 years additional if built of wood materials of the 5 years' grade and under; 3 years additional, if built of materials exceeding the 5 years' and under the 12 years' grade; and 4 years additional, if built of 12 years' materials or above.

Ships thus Restored to be subject to annual survey, and to the half-time survey, as prescribed in Section 34.

Section 59. Ships which have been doubled when Restored (or in which the requirements of the last paragraph, Section 56, or the second and third paragraphs of Section 57, have been complied with) shall be entitled to Continuation, subject to the same conditions of survey and examination as are prescribed for ships proposed to be Continued at the expiration of the period first assigned to them (Section 54); but in like manner, the term of such extended Continuation shall be limited to a period not exceeding one-third or two-thirds of the number of years for which the ships may respectively have been Restored (exclusive of time allowed for doubling), without any reference whatever to the period originally assigned to them.

At the termination of the several periods assigned to ships for remaining on the Character A, or A in Red, they will have the word "expired" inserted against them; and if not surveyed prior to the reprinting of the Register Book, they will appear without any character.\*

But if during the *last year* of the period assigned to them, the Owners of a ship shall, in consequence of her being about to proceed on a distant foreign voyage, apply to have her surveyed for Continuation on the letter A, or for the Character A in Red, a special survey shall be held conformably to the Rules, Sections 54 or 60 as the case may be: and if from the report of such special survey, the ship shall appear to be in all respects in a sound and efficient state, such as is required by those Rules, the Committee shall, from the period at which the ship's character would terminate, continue her on the letter A, or assign to her the Character A in Red in accordance with the Rules referred to.

#### SHIPS A, IN RED.

**Section 60.** Ships found on survey to be of a superior description, being fit for the safe conveyance of dry and perishable goods to and from all parts of the world, subject to the following conditions, shall be classed A in Red, as the Second description of the First class.

In all cases in which the Owner may claim this character, the ship must undergo a special survey by two Surveyors (to be appointed in every instance by the Committee), one of whom shall be an exclusive officer of the Society.

Then if the following Survey, designated Survey No. 1, be complied with within twelve months of the expiration of the Character A, either on original Classification, Continuation, or Restoration, one-third of the

\* The terms of years assigned to ships on the Character A, launched previously to the 1st July, 1859, also of ships launched during the first six months of the years 1860, 1861, 1862, and 1863, will expire on the 31st December of the last year of the periods assigned to them respectively.

The terms assigned to ships launched during the last six months of the years 1859, 1860, 1861, and 1862, will expire on the

30th June next after the last year of the periods assigned to them respectively.

In the case of ships launched on and after the 1st July, 1863, the period originally assigned to them on the A 1 character, will in every case date from the month in which the vessel may be launched, and will expire at the end of the corresponding month in the year at which the period assigned terminates.

number of years assigned originally, or such as might have been assigned, will be granted from the date of such Survey.

If at any time the following Survey, designated Survey No. 2, be complied with, a period of two-thirds the number of years assigned originally, or such as might have been assigned, will be granted from the date of such Survey.

In the repair of vessels for the above character, no materials may be used of a description inferior to those allowed in new ships for the six years' grade, except in the case of vessels originally classed for a shorter period than six years, when materials equal to those used in the original construction will be permitted.

#### FIRST SURVEY FOR A, IN RED.

The ship must be either placed in dry dock or laid on blocks, upon ways so that the keel may be examined. To be scraped or dubbed bright from the light water-mark upwards, including the planksheers and waterways, so as to expose the surface of the plank to view.\*

The hold to be cleared, and proper stages to be made both inside and outside.

All air-courses and the limbers to be cleared.

The condition of the timbers of the frame to be further ascertained by a new listing not less than 4 inches wide, being cut out of the ceiling at each end of the hold on each side, between the keelson and air-course under the hold-beam clamp, for one-fifth the entire length of the ship.

One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the planksheers, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers, and planking in the treenail holes.

Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

If the fastenings in the range of the lower deck be of iron not through the outside planking, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

All treenails, bolts, and listings, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

\* If the ship has been sheathed with wood over felt, within a period of five years, and the plank from the light water-mark upwards shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained, and favourably reported upon by the Surveyors; and provided that the sheathing which covers the raft-ports and binding-bolts, and a strake of sheathing all fore and aft on each side under the wales be removed, and listings of sheathing cut out at hood ends, and the planking, fastenings, and caulking so exposed shall prove to be in good condition, then, on application to the Committee, the stripping from the light water-mark upwards may be dispensed with; but whenever the sheathing is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

If the ship has been sheathed with metal within a period of two years, and it shall appear to the Surveyors that stripping from the light water-mark upwards may be dispensed with, the case will receive due consideration on application to the Committee.

Where the middle line bolts are of iron, their condition is to be ascertained; but if this be not practicable, additional bolts, of sufficient size, must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, sternpost, and deadwood.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The anchors, cables, and general equipment to be attended to as prescribed in Sections 71 to 76.

The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and comings; the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the planksheers, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breasthooks, stempost, inner-post, and transoms; the floors, keelsons, and keel; the rudder and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

The ship to be efficiently repaired with suitable materials.

The term for which a vessel may be assigned the Character A in Red, upon a compliance with the foregoing requirements, will not exceed one-third the number of years of that assigned originally, or such as might have been assigned, subject to the usual annual survey, and also to the half-time survey, as prescribed in Section 34.

If, however, in addition to the above, the ship be diagonally doubled according to Section 68, then, in the case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under the 12 years' grade, will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional,\* provided a strake all fore and aft at the upper edge of the doubling, or the planksheers, be removed.

### SECOND SURVEY FOR A, IN RED.

For the purpose of holding such Survey, the ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.†

All the outside planking, from the light water-mark upwards, including the planksheers and waterways, to be scraped or dubbed bright.

The hold to be cleared, and proper stages made both inside and outside.

All air-courses and the limbers to be cleared.

- \* In the case of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.
- † If the ship has been sheathed with wood over felt, within a period of five years, and the plank shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained and favourably reported upon by the Surveyors, and provided that the sheathing, which covers the binding bolts and raft ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listing of sheathing cut out at hood ends; and the planking, fastenings, and caulking so exposed, shall prove to be in good condition, then, on application to the Committee, the stripping of the wood sheathing may be dispensed with; but whenever it is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

The condition of the timbers of the frame to be further ascertained by the removal of all the treenails in one strake in the topsides fore and aft, on each side, and by the removal of two planks on each side above the wales.

In addition, a plank to be removed in each bow and buttock.

One treenail to be driven out from every alternate frame or fourth timber, between the upper edge of the wales and the light water-mark, and at such other parts of the topsides and bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

If the whole of the treenails from the light water-mark upwards have to be renewed, the removal of a plank in each bow and buttock will be sufficient, provided the timbers in the treenail-holes be examined and found in good condition.

Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

If the fastenings in the range of the lower deck be of iron not through the outside planking, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

Where the middle-line bolts are of iron, their condition is to be ascertained; but if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, sternpost, and deadwood.

Plank, or a new listing of ceiling, of sufficient breadth (not less than four inches wide), at the discretion of the Surveyor, to be cut out of the ceiling in the range of the floor-heads, or at such height as may in the judgment of the Surveyors best expose the timbers of the frame to view, at each end of the hold for one-fifth the entire length of the ship, and for the remaining three-fifths of the ship's length the state of the timbers to be ascertained by driving out a treenail from every fourth timber in one or other of the strakes of the bilge planking. If the Ship Owner should prefer it, planking may be removed outside, at each end of the ship, in the range of the floor-heads.

In order to ascertain the condition of the upper deck beam ends, a strake of deck next the waterways on each side to be taken out, except where it is covered by a poop or a forecastle, and where this exception arises the strake should be removed as far aft as the first beam within the poop, and as far forward as the first beam within the forecastle. On the decks below, as well as on the upper deck beyond the above limits, the plank need not be removed provided the beams be tested by boring and sounding and be found good.

In British North American built Ships and Fir Ships a strake of deck next the waterways on each side is to be taken out.

All treenails, bolts, listings, and planking removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The anchors, cables, and general equipment to be attended to as prescribed in Sections 71 to 76.

The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and comings; the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the planksheers, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breasthooks, stempost, inner-post, and transoms; the floors, keelsons, and keel; the rudder and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

The ship to be efficiently repaired with suitable materials.

To entitle them to continue this Character, such ships will be required, in addition to the usual annual survey, to undergo the half-time survey as prescribed in Section 34, and to undergo a special re-survey as prescribed above, within a period (from the date of the last special re-survey) not exceeding two-thirds of the several terms of years originally assigned to them, or earlier, if, in the judgment of the Surveyors, upon a careful examination of the ship, the same shall appear to them to be necessary.

If, however, in addition to the above, the ship be diagonally doubled, and the other requirements be complied with, according to Section 68, then, in case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under the 12 years' grade, will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional.\*

#### SHIPS Æ.

Section 61. Ships that have passed the prescribed age for the A character, but have not undergone the repairs which would have entitled them to be Continued or Restored; or having been Continued or Restored, and the additional period thus assigned expired, and also such ships as have never had an original character, which shall be found on survey fit for the conveyance of dry and perishable goods on shorter voyages, shall be distinguished by the diphthong Æ; and a careful survey will be required to be made annually, or on the return of the ship from every foreign voyage, by one of the Surveyors to this Society, who is to state distinctly and separately the actual condition of the upper deck fastenings, waterways, spirketting, planksheers, topsides, upper deck with its appendages, lower deck fastenings, wales, counter, plank, and treenails outside to the water's edge, rudder, windlass and capstan, beams, breasthooks, transoms and timbers; but if not surveyed within twelve months, such ship having been during that time in some port in the United Kingdom, the Character will be omitted until such survey be held; or, as the case may be, she will be allowed to pass in the class E.

## BRITISH NORTH AMERICAN AND ALL FIR SHIPS.+

Section 62. Ships built in the British North American Colonies, and all ships wherever built, the frames of which are composed of Fir, of 400 tons and above, shall, in order to entitle them to be classed in

<sup>\*</sup> In the case of ships previously doubled, or ships of peculiar construction, special application may be made to the

<sup>†</sup> See also Section 39, paragraph 5.

the Register Book of the Society, be secured in their bilges by the application of iron knee riders, or hanging knees and riders to cover the joints of the floor and futtock heads, to extend from the height of the hold beams to the floors so as to receive not less than two bolts in a substantial part of the floors.

The number of iron knees and riders to be not less than one of each to every hold or lower deck beam on each side. The knees to be connected with the riders or not, at the option or convenience of the Owners; but if not so connected, the side arms of the knees are to be of the length and to be fastened as prescribed in Table F.

The number of knees to each deck, and of riders, also their dimensions, and number of bolts, are fully explained in Table F.

All ships built in the Colonies will be considered as "iron fastened" in their centre lines, unless it shall be satisfactorily shown to the contrary, either by the exposure of some of the bolts, or by a certificate to be produced from the Builders.

Ships which proceed to sea without being fastened with the iron knees and riders prescribed by the Rules,\* will have One Year deducted from the period to which they would otherwise be entitled to be classed in the Register Book.

#### BRITISH NORTH AMERICAN SHIPS, Æ CLASS.

Section 63. All British North American built ships, which have gone, or may go off the List of Ships of the A character, or which may be of an age exceeding the period for which they might have had claims to be put upon that grade (whether classed or not), shall, as from time to time they come under examination, be subjected to a careful survey, to be made by one of the Surveyors to this Society;—and no further character shall be assigned them unless a survey shall be held as follows; either by removing planking outside, equal in breadth to an entire strake, for one-fifth the length of the vessel forward and aft on both sides, or by cutting listings inside five inches wide to the same extent in the fore and after bodies in line with the upper turn of bilges, or at such height as may, in the judgment of the Surveyors, best expose the timbers of the frame to view, and for the remaining three-fifths of the vessel amidships the state of the timbers to be ascertained by driving out a treenail in every fourth timber in one or other strake of bilge planking; that a special report of the state of these timbers, and of the general state and condition of the upper deck fastenings, waterways, spirketting, planksheers, topsides, upper deck with its appendages, lower deck fastenings, wales, counter, plank and treenails outside to the water's edge, rudder, windlass and capstan, beams, and breasthooks, shall be transmitted by the Surveyors to the Committee; and on the receipt of such report the character shall be assigned.

If the Æ character be then assigned, it shall be continued (subject to an annual survey) for a period not exceeding the number of years originally assigned; but in no case beyond that of five years; at the expiration of which the character will be discontinued, unless a similar survey and examination of the frame be again submitted to.

<sup>\*</sup> This applies not only to British North American ships, but to all wooden vessels.

#### SHIPS E.

Section 64. Will comprise all ships which shall be found on survey fit for the conveyance of cargoes not in their nature subject to sea damage on any voyage.

Section 65. Subject to occasional inspection, at least once in every two years, ships will continue in this class so long as their condition shall, in the opinion of the Committee, entitle them thereto.

#### SHIPS I.

Section 66. Will comprise ships which shall be found on survey fit for the conveyance, on shorter voyages (not out of Europe), of cargoes in their nature not subject to sea-damage.

#### CAULKING.

Section 67. The Bottom of every ship is to be CAULKED\* once in every five years, unless woodsheathed and felted, and then once in every seven years, except in the case of *Teak-built ships*, upon which a special survey may have been requested, and the Surveyors having ascertained, by the removal of a strake of sheathing fore and aft under the wales, and a strake at the first futtock heads, and by causing listings to be cut out at the hood ends, that such caulking is not required, the same may then be dispensed with.

If any ship shall be stripped within the periods above mentioned, her bottom is to be caulked, if necessary.

#### DOUBLING.

Section 68. In all cases in which ships may be doubled, doubling of not less than the thickness hereinafter mentioned will be required, the same to be properly wrought and fastened as follows: in every instance the doubling is to be at least single fastened either with treenails or with bolts,† and a through bolt in every butt. If treenails be used, every treenail must, if practicable, be a through fastening; and if bolts be used, then one-sixth of them from the lower part of the bilge upwards must be through and clenched on the ceiling in addition to the butt bolts. In all cases of doubling, the rudder braces are to be removed.

The throat bolts of iron knees, and the bolts of iron hooks, crutches, and pointers, must be renewed through the doubling.

<sup>\*</sup> In cases where ships have been doubled with doubling of less thickness than is required by, or not fastened in accordance with, the Rules, it will not be imperative that such doubling be stripped at the expiration of seven years, as required for ordinary sheathing; but if, upon survey, the doubling be found in good condition, the period for its remaining on may be extended, with the sanction of the Committee, to a term not exceeding ten years, provided the doubling below the wales be copper or yellow metal fastened or treenailed.

<sup>†</sup> Ships hereafter doubled, if the doubling be iron fastened, will lose their character, if such fastenings be coppered over. 21st September, 1865.

The thickness of the doubling for the wales and bottom, on ships

Under 400 tons to be not less than	 	 2 inches
of 400 ,, and under 600 tons	 	 $2\frac{1}{2}$ ,,
of 600 ,, and above	 	 3 ,,

On the topsides of ships not exceeding 300 tons, the thickness may be  $1\frac{1}{2}$  inches.

No ship hereafter doubled shall be entitled to the Character A, or A in Red, unless at the time of doubling it be ascertained, in either case, that the frame is capable of securely retaining the fastenings, by one treenail being driven out in every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails and timbers, and of the planking in the treenail holes, or should the state of the treenails indicate defective timbers, or should the outside planking be bolt fastened, then, by cutting out listings or plank at the discretion of the Surveyor.

Before doubling, the original fastenings in the outside planking and the rider bolts should be ascertained to be in efficient condition, or be made good, but all treenails, from the upper part of chocks at second futtock heads to the lower part of chocks at floor-heads to be renewed with through treenails of hard wood for at least half the length of the ship amidships, unless the Surveyors, by having a sufficient number driven out, fully satisfy themselves that they are well made, tightly driven, and in good condition.

In all cases the throat bolts and the bolt next thereto in the iron knees and riders must be renewed through the doubling.

#### DIAGONAL DOUBLING.

If the doubling be applied diagonally, on the wales and bottom, it will be allowed to be of the following thicknesses, viz:—

In ships under 500 tons	 	 $1\frac{1}{2}$ inches
" 500 tons and under 1,000 tons	 	 2 ,,
,, 1,000 tons and upwards	 	 $2\frac{1}{2}$ ,,

Diagonal doubling on ships is to be fastened as under, viz.:-

If worked not above 11 inches broad it may be single fastened with a through bolt at every butt, every fifth fastening to be a through bolt or a through treenail of hard wood; the distance between these through fastenings not to exceed 4 ft. 6 in. The remaining fastenings to consist of through treenails or two long and two short dump bolts; the length of the short dumps may be half an inch less than the combined thickness of the doubling and the original outside plank, and that of the long dumps to be not less than the thickness of the doubling added to twice the thickness of the original outside plank.

At the upper edge of the doubling, which is to be sufficiently high to enable the butt bolts of the diagonal planks to pass through the lower deck spirketting, a strake of planking is to be taken out fore and aft, and a

strake is to be worked in its place, on the timbers, sufficiently thick to project to the outside of the doubling. The butts of the diagonal doubling are then to be rabbetted into this thick strake; or a fore and aft strake of doubling may be worked below the thick strake, and be rabbetted into it, and the butts of the diagonal doubling may be butted against this fore and aft strake. Or, if the strake of planking is not removed and the thickstrake is not worked, there must be at the upper ends of the diagonal doubling a fore and aft strake, having its upper edge let into the original plank sufficient to form a caulking seam, say not less than  $1\frac{1}{2}$  inches. The lower ends of the diagonal doubling to be worked against two strakes of fore and aft doubling, the lower edge of the lower strake being rabbetted into the keel, and to be not less in thickness than one and a half times the thickness of the doubling. All diagonal doubling to be of rock elm or of equally suitable material, and be wrought on hair felt.

## EXTENSION OF CLASS FOR DIAGONAL DOUBLING.

Ships diagonally doubled in conformity with the Rules, after the expiration of twelve months from the date of launching, shall be allowed an extended period of classification to the extent described hereafter.

Also ships surveyed for Continuation, Restoration, and the Character A 1 in red, which shall be diagonally doubled in conformity with the Rules, shall, on account of such doubling, be allowed an extension of the term otherwise assigned to them as under, viz.:—

Ships built of wood materials of the 5 years' grade and under, shall be allowed 2 years additional on account of being doubled diagonally; those built of materials exceeding the 5 and under the 12 years' grade, shall be allowed 3 years additional; and those built of 12 years' materials, 4 years additional.

To entitle ships to the advantages of this Rule when surveyed for Continuation, under Survey No. 2, Section 54, or for A in Red under Second Survey, Section 60, it will be necessary, in addition to the other requirements of the Rules, that in *flush decked Vessels* the planksheer be removed on each side all fore and aft, so as to expose the heads of the timbers and the back of waterways to view; also that a strake of upper deck next the waterway be taken out all fore and aft, and the beams of the decks below be tested by boring and sounding. But in Ships having a poop and forecastle, it will be necessary to remove the planksheer on both sides from the poop to the forecastle, and the mouldings in continuation of the planksheer forward and aft; or a portion of a strake of topside planking from the fore part of the poop aft, and from the after part of the forecastle forward; but it will not be necessary to remove planking of topsides from poop to forecastle where the planksheer has been removed, if the timbers thus exposed are in good condition; nor the strake of deck abaft the first beam within the poop and before the first beam within the forecastle, provided the beams are tested by boring and sounding and be found good.

If a ship be doubled at the time she undergoes the Continuation Rule, 1st Survey, or the 1st Rule for A in Red, the removal of a strake all fore and aft at the upper edge of the doubling may be substituted for the removal of the planksheer.

A similar relaxation of the Rule will, upon special application to the Committee, be allowed in the case of spar-decked Ships.

It is to be understood that no ship which has had an extended period for doubling can have a further extension for it when re-classed.

Minimum Weights of Anchors, ex. Stock; Sizes and Lengths of Chain C Hawsers and Warps. The Anchors and the links

NUMBERS FOR	SHIP's	IMA EMI			ameneo VI	Anchors.		DIAM VI	
IRON Vessels,			Number.			1	Weight.	cluding Sto	classed in
1871. (See Foot Note.)	TONNAGE.	Bowers.	Stream.	Kedges.		ers* AdmrltyTest.	Stream.	Kedge.	2nd Ke they are;
(500 1 000 1 000 1)	Tons.	Inch	Inoli	Inch	Cwts.	Tons.	Cwts.	Cwts.	Cwt the iron
2750	75	8 2	8 1	1	31	518	1	$\frac{1}{2}$	Book, and
3750	112	8 2	1	1	41/4	612	$1\frac{1}{2}$	3 4	
4670	150	8 2	1	1	5	7-7-	13.	1	1
5420	188	2	1	1	$5\frac{3}{4}$	8	2	1	e copper-
6170	225	2	8 1	1	61/2	815	$2\frac{1}{2}$	$1\frac{1}{4}$	_nd wood-
6840	262	2	8 1	1	71/4	9 9 2 0	234	11/4	_sheathing
7500	300	3	1 1	1	81/4	$10\frac{7}{20}$	3	11/2	_art of the
8750	375	3	1	2	10	12	$4\frac{3}{4}$	21	e A or on assigned
9800	450	3	1	2	12	$13\frac{17}{20}$	5	$2\frac{1}{2}$	14 the iron
10800	525	3	1	2	$13\frac{1}{2}$	1520	6	3	1½ including
11830	600	3	8 1	2	151	1614	$6\frac{1}{2}$	31/4	134
12750	675	3	1	2	$16\frac{3}{4}$	18	7	$3\frac{1}{2}$	134
13670	750	3	9 1	2	18	19	8	4	2 r, pumps
15400	900	3	1	2	21	$21\frac{1}{2}\frac{2}{0}$	9	41/2	21d in good
17000	1050	3	01	2	$23\frac{1}{2}$	$23\frac{1}{2}\frac{0}{0}$	10	5	$2\frac{1}{2}$
18580	1200	3	1	2	$25\frac{1}{2}$	$25\frac{3}{20}$	$10\frac{1}{2}$	51/4	23 them, the
20160	1350	3	1	2	$27\frac{3}{4}$	$26\frac{1}{2}\frac{8}{0}$	11	$5\frac{1}{2}$	234
21660	1500	3	1	2	30	$28\frac{12}{20}$	12	6	3, properl
24580	1800	3	1	2	32	$30\frac{2}{20}$	13	$6\frac{1}{2}$	3½ (See als
27500	2100	3	1	2	34	3112	131	$6\frac{3}{4}$	31
30330	2400	3	1	2	361	$33\frac{8}{20}$	14	7	3; must b
33100	2700	3	1	2	38	$34\frac{10}{20}$	14½	71	31/2
35750	3000	3	1	2	40	$35\frac{1}{2}\frac{5}{0}$	15	71/2	33 oval from
EAR	3750	1 81	1 .54	1	BACK	2000	1 1000	1	

<sup>\*</sup> Two of the Bower Anchors must not be less than the weight set forth above, but in the third a reduction of 15 per cent. will be allowed.

All Anchor Stocks must be of acknowledged and approved description.

t In ca quired. links, not cent. bey and every

Lloyd's Register of Shipping,

2, White Lion Court, Cornhill, 25th May, 1871.

By Section 27 of the Rules, dated 24th February, 1870, for the Building and Classification of Iron Shi designated moulded breadth of the vessel amidships, her depth from the upper part of keel to the top of the upper deck be decked vessels, and for spar-decked steam vessels."

For a vessel with an awning-deck, the equipment number to be increased one-sixth beyond that whit For a vessel with a partial awning deck, poop, topgallant forecastle, or a raised quarter deck, the equipment

No. 293.

strake is to be worked in its place, The butts of the diagonal doubling doubling may be worked below the may be butted against this fore a thickstrake is not worked, there n having its upper edge let into the o The lower ends of the diagonal d edge of the lower strake being rat times the thickness of the doublin and be wrought on hair felt.

### EXTENSI(

Ships diagonally doubled in date of launching, shall be allowed

Also ships surveyed for Contidoubled in conformity with the I term otherwise assigned to them as a

Ships built of wood material account of being doubled diagonally shall be allowed 3 years additional

To entitle ships to the advar Section 54, or for A in Red under requirements of the Rules, that in aft, so as to expose the heads of t deck next the waterway be taken and sounding. But in Ships havi both sides from the poop to the for aft; or a portion of a strake of to of the forecastle forward; but it wil where the planksheer has been remo deck abaft the first beam within the are tested by boring and sounding a

If a ship be doubled at the tA in Red, the removal of a strake at the removal of the planksheer.

A similar relaxation of the Ru of spar-decked Ships.

It is to be understood that no sh for it when re-classed.

CHAIN CABLES.

LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING

TESTING TO BREAKING STRAIN.

With reference to the proposed postponement of the operator of the Chain Cables and Anchors Act, 1871, the Committee of this SouthEREBY GIVE NOTICE, that they will adhere to the Resolution embed in Notice No. 285, dated 14th December last, viz.:—

"That Chains tested up to the 1st July, 1872, under the existing Act Machine recognised by the Committee, will be accepted for any Vessel be commenced, or contracted for *prior* to the New Act coming into force on 1st July, 1872; and that all Vessels built, commenced, or contracted for the 30th June, 1872, will be required to be supplied with Chains tested conformity with the requirements of the New Act."

By order of the Committee,

GEORGE B. SEYFANG,

Secre

2, White Lion Court, Cornhill, London, E.C.
16th May, 1872.

Minimum Weights of Anchors, ex. Stock; Sizes and Lengths of Chain Cables, and the proof strain to which they are to be tested; also Sizes and Lengths of Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

-							101111111111111111111111111111111111111	NUMBER OF THE	US USESTIMAN										
Numbers for IRON Vessels,	SHIP'S				A	NCHORS.				STUI	-CHAIN CA	BLES. †	SHIP'S	Numbers	Name of Street	Hawsi	ERS AND	WARPS.	and I
PER RULES	ARCES.	M. axx	Number				Weight.	1 1' Cu	1		Proved to	- MajoW		FOR	Str	eam.	1	-	1
1871. (See Foot Note.)	TONNAGE.	Bowers.	Stream.	Kedges.	Ex. Stock.	ers.* AdmrltyTest.	Stream.	kedge.	ck.  2nd Kedge.	Minimum Size	Admiralty Test, &c.	Length.	TONNAGE.	IRON VESSELS.	Chain.	Rope.	Hawser.	Warp.	Length.
E 2 1 2 2	Tons.			No in its	Cwts.	Tons.	Cwts.	Cwts.	Cwts.	Inches.‡	Tons.	Fathoms.	Tons.		Inch.	Inch.	Inch.	Inch.	
2600	50	2	1	1	31/2	$5\frac{18}{20}$	1	$\frac{1}{2}$	oT I.d	11 16	810	120	50	2600	7 16	5	3		
3200	75	2	1	1	41/4	$6\frac{1}{2}\frac{2}{0}$	11/2	3 4	-	$\frac{1}{1}\frac{2}{6}$	$10_{\frac{2}{20}}$	120	75	3200	8 16	5	3	0-4	- 03
3400	100	2	1	1	5	720	134	1	101	$\frac{13}{16}$	$11\frac{1}{2}\frac{7}{0}$	150	100	3400	8 16	51/2	3		
3810	125	2	10	1	$5\frac{3}{4}$	8	2	1	-	14	$13\frac{15}{20}$	180	125	3810	8 16	51/2	31/2	-	
4140	150	2	1	1	61/2	$8\frac{1}{2}\frac{5}{0}$	$2\frac{1}{2}$	11/4	64	$\frac{15}{16}$	$15\frac{16}{20}$	180	150	4140	9 16	6	4		
4610	175	2	1	1	71/4	$9_{\frac{9}{20}}$	$2\frac{3}{4}$	11/4	01	1	18	180	175	4610	9 16	6	4	_	
5020	200	3	1	1	81/4	$10\frac{7}{20}$	3	$1\frac{1}{2}$	part of the	116	$20\frac{6}{20}$	180	200	5020	Rope.	61/2	4	-	each.
6070	250	3	1	2	10	12	43	21/4	1	$1\frac{2}{16}$	$22\frac{1}{2}\frac{5}{0}$	210	250	6070	10 5	7	5	-	
6920	300	3	18	2	12	$13\frac{1}{2}\frac{7}{0}$	5	$2\frac{1}{2}$	11	1 3 1 6	$25\frac{7}{20}$	210	300	6920	hain hain	$7\frac{1}{2}$	51/2	-	fathoms
7880	350	3	1	2	$13\frac{1}{2}$	$15\frac{3}{20}$	6	3	11/2	1-4-	28-20	240	350	7880	11 5	71/2	51/2	-	
8600	400	3	1	2	151	$16\frac{1}{2}\frac{4}{0}$	61/2	31/4	13	1 5 6	31	240	400	8600	12 de	8	6	000	06
9420	450	3	1	2	163	18	7	31/2	134	1 1 6	34	270	450	9420	12 e e e	81/2	61/2	-	pe pe
10030	500	3	1	2	18	19	8	4	2	1-7-	$37\frac{3}{20}$	270	500	10030	13 kg u	9	7	-	a to
11300	600	3	1	2	21	$21\frac{1}{2}\frac{2}{0}$	9	41/2	21	1 8 1 6	$40\frac{1}{2}\frac{0}{0}$	270	600	11300	13 (pa	91/2	7	4	them
12500	700	3	1	2	231	$23\frac{10}{20}$	10	5	21/2	1 9 1 6	4318	300	700	12500	14 inb	10	8	5	of 1
13580	800	3	1	2	$25\frac{1}{2}$	$25\frac{3}{20}$	101	51/4	23	110	4710	300	800	13580	14 91	10	8	5	sth
14620	900	3	1	2	273	$26\frac{18}{20}$	11	51/2	234	1116	51 20	300	900	14620	15 Ku	10	9	$5\frac{1}{2}$	Length
15600	1000	3	1	2	30 0010	$28\frac{1}{2}\frac{2}{0}$	12	6	3	112	$55\frac{2}{20}$	300	1000	15600	15 0 16 g	10	9	51/2	The ]
17500	1200	3	1	2	32	$30\frac{2}{20}$	13	61/2	31	113	59-20	300	1200	17500	1 treat	10	91/2	6	E
19320	1400	3	1	2	34 088	$31\frac{1}{2}\frac{2}{0}$	13½	63	31/4	114	$63\frac{5}{20}$	300	1400	19320	1 0	10	10	6	04
21100	1600	3	1	2	361	33-8	14	7	31/2	1 1 5 1 6	$67\frac{1}{2}\frac{1}{0}$	300	1600	21100	116	11	101	612	1 0
22720	1800	3	1	2	38 088	3410	14½	71	$3\frac{1}{2}$	2	72	300	1800	22720	116	11	11	7	
24400	2000	3	1	2	40	3515	15	71/2	3 3 4	216	$76\frac{11}{20}$	300	2000	24400	1,16	11	11	7	0
28300	2500	3.1	1	2	42	$37\frac{2}{20}$	17	81/2	41/4	$2\frac{2}{16}$	81 - 5	330	2500	28300	$1\frac{2}{16}$	12	12	8	
32100	3000	3	1	2	45	39 5 0	19	91/2	43	214	$91\frac{2}{20}$	360	3000	32100	$1\frac{3}{16}$	12	12	8	
		-			1	1	I market more		which one spills	COROR Wilcom			To the Custo State		· manage			B LONG BURNER	

<sup>\*</sup> Two of the Bower Anchors must not be less than the weight set forth above, but in the third a reduction of 15 per cent. will be allowed.

All Anchor Stocks must be of acknowledged and approved description.

Lloyd's Register of Shipping,

<sup>2.</sup> White Lion Court, Cornhill, 25th May, 1871.

<sup>‡</sup> In cases where parties are desirous of using or sapplying new Chains of smaller size than is set forth above, a reduction will be allowed not exceeding one-sixteenth of an inch in Chains of 1 inch to 1½ inch diameter, and one-eighth of an inch in Chains above 1½ inch diameter, provided they be subjected to the Admiralty Strain for the size for which they are to be substituted, and further, that a few links, not less than twelve, to be selected by the tester, shall be proved to the breaking strain, and show a margin of at least 10 per cent, beyond the Admiralty Proof for a chain of the full size required by the Table.

By Section 27 of the Rules, dated 24th February, 1870, for the Building and Classification of Iron Ships, it is provided that "Their equipment is to be regulated by the Number produced by the sum of the addition of the half moulded breadth of the vessel amidships, her depth from the upper part of keel to the top of the upper deck beam, and the girth of her half midship section to the same height, multiplied by the vessel's length, for one, two, and three-decked vessels, and for spar-decked steam vessels."

For a vessel with an awning-deck, the equipment number to be increased one-sixth beyond that which it would be if she were flush decked and without an awning-deck.

For a vessel with a partial awning deck, poop, topgallant forecastle, or a raised quarter deck, the equipment number to be increased one-tenth beyond that which it would be if she were flu h decked.

+ Unstudded close-link Chains will be admitted as Cables, if proved to two-thirds the Test required for Stud-Chains. But in all such cases a short length, not less than twelve links, must be tested up to the full strain for Stud-link Chains.

Minimum Weights of Anchors, ex. Stock; Sizes and Lengths of Chain Cables, and the proof strain to which they are to be tested; also sizes and lengths of Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

Numbers for	SHIP'S	1			A	NCHORS.		CARGO WI	tarra et a	ST	UD-CHAIN CA	BLES. †	SHIP's	Numbers for IRON Vessels,		Hawsi	ERS AND	WARPS.	10 100
IRON Vessels,			Number.				Weight.	11 0	1	Mini-	Proved to	bulout		PER RULES	Stre	am.	b	1.0022	THE REAL PROPERTY.
1871. (See Foot Note.)	TONNAGE.	Bowers.	Stream.	Kedges.	Bow Ex. Stock.	ers* AdmrltyTest.	Stream.	cluding Sto Kedge.	2nd Kedge.	mum Size.	Admiralty Test, &c.	Length.	TONNAGE.	1871. (See Foot Note.)	Chain.	Rope.	Hawser.	Warp.	Length.
	Tons.				Cwts.	Tons.	Cwts.	Cwts.	Cwts.	Inch.	Tons.	Fathoms.	Tons.		Inch.	Inch.	Inch.	Inch.	
2750	75	2	1	1	31/2	$5\frac{18}{20}$	1201	1/2	1 1 1	11/16	810	120	75	2750	8 16	$5\frac{1}{2}$	3	-57	
3750	112	2	1	1	$4\frac{1}{4}$	612	11/2	3 4	-	12	$10\frac{2}{20}$	120	112	3750	9 16	6	4	-00	
4670	150	2	1	1	5	7-7-20	13.	1		13	$11\frac{1}{2}\frac{7}{0}$	150	150	4670	16	6	4	-68	
5420	188	2	1	1	$5\frac{3}{4}$	8	2	1		14	$13\frac{15}{20}$	180	188	5420	10	$6\frac{1}{2}$	4	-031	
6170	225	2	1	1	$6\frac{1}{2}$	815	$2\frac{1}{2}$	11/4	_ 77	15	15 = 6	180	225	6170	10	7	5	75-	
6840	262	2	1	1	71/4	9-9-	$2\frac{3}{4}$	11/4	-	1	18	180	262	6840	Rope	$7\frac{1}{2}$	$5\frac{1}{2}$	-00	ach.
7500	300	3	1	1	81/4	$10\frac{7}{20}$	3	11/2	Suips Ma	1-1-6	$20\frac{6}{20}$	180	300	7500	11 5	71	6	-68	90 fathoms each
8750	375	3	1	2	10	12	434	21/4	1	1-2	$22\frac{1}{2}\frac{5}{0}$	210	375	8750	Chain Chain	81/2	61	-601	hon
9800	450	3	1	2	12	$13\frac{17}{20}$	5	$2\frac{1}{2}$	11/4	1 3 1 6	$25\frac{7}{20}$	210	450	9800	13 T	9	7	-00	fat
10800	525	3	1	2	$13\frac{1}{2}$	1520	6	3	11/2	14	28-2-	240	525	10800	ther ther	$9\frac{1}{2}$	7	4	900
11830	600	3	1	2	151/4	1614	$6\frac{1}{2}$	31/4	13/4	1 1 5	31	240	600	11830	14 og	10	8	5	to he
12750	675	3	1	2	$16\frac{3}{4}$	18	7	$3\frac{1}{2}$	13/4	1-6	34	270	675	12750	14 kgu	10	8	5	m t
13670	750	3	1	2	18	19	8	4	2	1 7 16	$37\frac{3}{20}$	270	750	13670	15 (pe	10	9	$5\frac{1}{2}$	The Length of them
15400	900	3	1	2	21	2112	9	41/2	21/4	1-8	$40\frac{10}{20}$	270	900	15400	15 dinb	. 10	9	$5\frac{1}{2}$	Jo t
17000	1050	3	1	2	$23\frac{1}{2}$	$23\frac{10}{20}$	10	5	$2\frac{1}{2}$	1 9 1 6	4318	300	1050	17000	1 one	10	91	6	ngth
18580	1200	3	1	2	$25\frac{1}{2}$	$25\frac{3}{20}$	$10\frac{1}{2}$	51/4	$2\frac{3}{4}$	110	4710	300	1200	18580	1 of fluo		10	6	Le
20160	1350	3	1	2	$27\frac{3}{4}$	$26\frac{1}{2}\frac{8}{0}$	11	$5\frac{1}{2}$	$2\frac{3}{4}$	1116	$51\frac{5}{20}$	300	1350	20160	116 0	11	101	$6\frac{1}{2}$	The
21660	1500	3	1	2	30	2812	12	6	3	112	$55\frac{2}{20}$	300	1500	21660	1-1- in a in	11	11	7	
24580	1800	3	1	2	32	$30_{\frac{2}{20}}$	13	$6\frac{1}{2}$	31/4	113	$59\frac{2}{20}$	300	1800	24580	1-2 0	11	11	7	
27500	2100	3	1	2	34	3112	131	63	31/4	114	$63\frac{5}{20}$	300	2100	27500	1-2-	11	11	71/2	1 1
30330	2400	3	1	2	$36\frac{1}{2}$	$33\frac{8}{20}$	14	7	32	115	6711	300	2400	30330	1-2	12	12	8	
35750	2700	3	1	2	38	$34\frac{1}{2}\frac{0}{0}$	$14\frac{1}{2}$	71	31/2	2	72	300	2700	33100	$1\frac{3}{16}$ .	12	12	8	2
99790	3000	3	1	2	40	$35\frac{1}{2}\frac{5}{0}$	15	71/2	$3\frac{3}{4}$	216	$76\frac{11}{20}$	300	3000	35750	13	12	12	8	8
	3700										L company		3750	45 8	12			900	18

<sup>\*</sup> Two of the Bower Anchors must not be less than the weight set forth above, but in the third a reduction of 15 per cent. will be allowed.

All Anchor Stocks must be of acknowledged and approved description.

Lloyd's Register of Shipping, 2, White Lion Court, Cornhill, 25th May, 1871.

<sup>‡</sup> In cases where parties are desirous of using or supplying new Chains of smaller size than is set forth above, a reduction will be allowed not exceeding one-sixteenth of an inch in Chains of 1 inch to  $1\frac{1}{2}$  inch diameter, and one-eighth of an inch in Chains above  $1\frac{1}{2}$  inch diameter, provided they be subjected to the Admiralty Strain for the size for which they are to be substituted, and further, that a few links, not less than twelve, to be selected by the tester, shall be proved to the breaking strain, and show a margin of at least 10 per cent. beyond the Admiralty Proof for a chain of the full size required by the Table.

By Section 27 of the Rules, dated 24th February, 1870, for the Building and Classification of Iron Ships, it is provided that "Their equipment is to be regulated by the Number produced by the sum of the addition of the half decked vessels, and for spar-decked steam vessels."

For a vessel with a partial awning deck, poop, topgallant forecastle, or a raised quarter deck, the equipment number to be increased one-sixth beyond that which it would be if she were flush decked and without an awning-deck.

For a vessel with a partial awning deck, poop, topgallant forecastle, or a raised quarter deck, the equipment number to be increased one-tenth beyond that which it would be if she were flush decked.

# IRON-FASTENED SHIPS.

Section 69. All ships, although iron-fastened (except as hereinafter mentioned), shall be classed in the same manner as copper-fastened ships, so long as they remain unsheathed with copper, provided they are, in all other respects, constructed in accordance with the Rules; but when sheathed with copper over the iron fastenings, the words "Coppered over Iron Bolts" shall be added to the Character in the Register Book, and continued until the ship be thoroughly copper-fastened.

# SHIPS BUILT IN INDIA.

Section 70. Ships built in India, although fastened with iron, shall be permitted to be coppersheathed without any mark being placed in the book, provided the bottom be felted or chunamed and woodsheathed, and subjected to a careful examination of the iron fastenings on every occasion on which the sheathing is stripped off, for which purpose some of the bolts and nails are to be taken out of the lower part of the bottom, and to be seen by the Surveyor; but no such ship shall be permitted to continue either on the A or on the A in Red class for a longer period than one-half the number of years beyond the term originally assigned for her remaining on the A character, unless the bottom shall have been doubled, or the whole of the iron fastenings taken out or properly secured, and the bottom refastened with bolts, or treenails, or both, including the middle line, breasthook, and crutch bolts.

# EQUIPMENT.

Section 71. All vessels are required to have their masts, spars, and rigging, the rudder, pumps, windlass or capstan, scuppers, and hawse pipes, in good order, and sails in sufficient number and in good condition.

Windlasses, if of wood, are in all cases to have a square iron spindle passed right through them, the diameter of the spindle to range from  $2\frac{1}{2}$  to 5 inches, according to tonnage.

Section 72. Every ship is to be provided with anchors, cables, &c., of approved quality, properly tested at a public machine,\* in number and length, as set forth in the Table, No. 22, annexed. (See also Section 32.)

A Certificate of all Chains and Anchors having been tested, and of the strain applied to them, must be produced before the ship is classed with the Figure 1.

- Section 73. The length and condition of the Chain Cables are to be ascertained by removal from the lockers on every Special Survey for Classification.
  - Section 74. In all cases where hempen cables are used, one-sixth more in length will be required.
- Section 75. BOATS:—All vessels under 150 tons to be provided with one good Boat; and every vessel of 150 tons and above to have a suitable number.
- Section 76. The efficient state and condition of the whole of the ship's equipment will be designated by the Figure 1; and where the same are found insufficient in quantity, or defective in quality, by the Figure 2.

\* See Notices in Appendix at end of Register Book.

36

ables, and the proof strain to which they are to be tested; also sizes and lengths of s of the Chains to be of unexceptionable form and proportions.

strake is t				1011	n and propor				8,3111	Sor Sor
The butts		JD-CHAIN CAI	BLES. †	SHIP's	NUMBERS FOR IRON Vessels,			ERS AND	WARPS.	21.
doubling n may be budge.	Mini- mum Size.	Proved to Admiralty Test, &c.	Length.	Tonnage.	PER RULES 1871. (See Foot Note.)	Strea	Rope.	Hawser.	Warp.	Length.
thickstrak s.	Inch.	Tons.	Fathoms.	Tons.		Inch.	Inch.	Inch.	Inch.	
having its	11 16	810	120	75	2750	8 16	$5\frac{1}{2}$	3		
The lower edge of the	12	$10^{\frac{2}{20}}$	120	112	3750	9 16	6	4	-001	
times the	13	1127	150	150	4670	9	6	4	-881	
and be wr	14	1315	180	188	5420	10 16	$6\frac{1}{2}$	4	-031	
77	15	1516	180	225	6170	10	7	5	-371	
	1	18	180	262	6840	Rope.	71/2	$5\frac{1}{2}$	-008	ach.
Ships	116	$20_{\frac{6}{20}}$	180	300	7500	11 0	$7\frac{1}{2}$	6	-000	1s eg
date of lat	$1\frac{2}{16}$	$22\frac{1}{2}\frac{5}{0}$	210	375	8750	Chain	$8\frac{1}{2}$	61	-006	hon
Also	13	$25\frac{7}{20}$	210	450	9800	13 4	9	7	-008	fat
doubled in term other	14	$28\frac{2}{20}$	240	525	10800	13 ta	$9\frac{1}{2}$	7	4	06
	1 1 5	31	240	600	11830	be cither	10	8	5	o be
Ships	1 6 1 6	34	270	675	12750	14 kg m	10	8	5	m t
account of	1 7 1 6	$37\frac{3}{20}$	270	750	13670	15 (pa	10	9	$5\frac{1}{2}$	the
shall be al To e	1 8 1 6	$40\frac{1}{2}\frac{0}{0}$	270	900	15400		10	9	5\frac{1}{2}	Jo 1
Section 54	1 9 1 6	4318	300	1050	17000	1 ou	10	91	6	agth
requiremen	110	$47\frac{1}{2}\frac{0}{0}$	300	1200	18580	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10	10	6	The Length of them to be 90 fathoms each
aft, so as	1116	$51\frac{5}{20}$	300	1350	20160	116 0	11	$10\frac{1}{2}$	$6\frac{1}{2}$	The
deck next	112	$55\frac{2}{20}$	300	1500	21660	11- a	11	11	7	
and sound	113	$59\frac{2}{20}$	300	1800	24580	1-2 0	11	11	7	
both sides	114	$63\frac{5}{20}$	300	2100	27500	1-2	11	11	71/2	
aft; or a of the fore	115	6711	300	2400	30330	1-2-	12	12	8	
where the	2	72	300	2700	33100	13.	12	12	8	25
deck abaft	216	7611	300	3000	35750	1316	12	12	8	8 1
are tested		N 200 10		3750	45 8	2 2	i		008	8

If a ses where parties are desirous of using or supplying new Chains of smaller size than is set forth above, a reduction will be allowed A in Red, ridled they be subjected to the Admiralty Strain for the size for which they are to be substituted, and further, that a few the removement the removement of the Admiralty Strain for the size for which they are to be substituted, and further, that a few less than twelve, to be selected by the tester, shall be proved to the breaking strain, and show a margin of at least 10 per cond the Admiralty Proof for a chain of the full size required by the Table.

A sin

of spar-dec

It is ps, it is provided that "Their equipment is to be regulated by the Number produced by the sum of the addition of the half am, and the girth of her half midship section to the same height, multiplied by the vessel's length, for one, two, and three-for it appears is

for it when it would be if she were flush decked and without an awning-deck.
If number to be increased one-tenth beyond that which it would be if she were flush decked.

+ Unstudded close-link Chains will be admitted as Cables, if proved to two-thirds the Test required for Stud-Chains. But in all such cases a short length, not less than twelve links, must be tested up to the full strain for Stad-link Chains.

# IRON-FASTENED SHIPS.

Section 69. All ships, although iron-fastened (except as hereinafter mentioned), shall be classed in the same manner as copper-fastened ships, so long as they remain unsheathed with copper, provided they are, in all other respects, constructed in accordance with the Rules; but when sheathed with copper over the iron fastenings, the words "Coppered over Iron Bolts" shall be added to the Character in the Register Book, and continued until the ship be thoroughly copper-fastened.

# SHIPS BUILT IN INDIA.

Section 70. Ships built in India, although fastened with iron, shall be permitted to be coppersheathed without any mark being placed in the book, provided the bottom be felted or chunamed and woodsheathed, and subjected to a careful examination of the iron fastenings on every occasion on which the sheathing is stripped off, for which purpose some of the bolts and nails are to be taken out of the lower part of the bottom, and to be seen by the Surveyor; but no such ship shall be permitted to continue either on the A or on the A in Red class for a longer period than one-half the number of years beyond the term originally assigned for her remaining on the A character, unless the bottom shall have been doubled, or the whole of the iron fastenings taken out or properly secured, and the bottom refastened with bolts, or treenails, or both, including the middle line, breasthook, and crutch bolts.

# EQUIPMENT.

Section 71. All vessels are required to have their masts, spars, and rigging, the rudder, pumps, windlass or capstan, scuppers, and hawse pipes, in good order, and sails in sufficient number and in good condition.

Windlasses, if of wood, are in all cases to have a square iron spindle passed right through them, the diameter of the spindle to range from  $2\frac{1}{2}$  to 5 inches, according to tonnage.

Section 72. Every ship is to be provided with anchors, cables, &c., of approved quality, properly tested at a public machine,\* in number and length, as set forth in the Table, No. 22, annexed. (See also Section 32.)

A Certificate of all Chains and Anchors having been tested, and of the strain applied to them, must be produced before the ship is classed with the Figure 1.

- Section 73. The length and condition of the Chain Cables are to be ascertained by removal from the lockers on every Special Survey for Classification.
  - Section 74. In all cases where hempen cables are used, one-sixth more in length will be required.
- Section 75. BOATS:—All vessels under 150 tons to be provided with one good Boat; and every vessel of 150 tons and above to have a suitable number.
- Section 76. The efficient state and condition of the whole of the ship's equipment will be designated by the Figure 1; and where the same are found insufficient in quantity, or defective in quality, by the Figure 2.

\* See Notices in Appendix at end of Register Book,

# SHIPS NAVIGATED BY STEAM.

Section 77. Steam ships are to be subject to the same periodical surveys as sailing vessels, and whenever the boilers are taken out, the vessel is to be submitted to a particular and special survey, in order to ascertain her general condition.

Section 78. With respect to the Boilers and Machinery, the Owners are required to produce to the Surveyors at the above-directed surveys, a certificate from some competent *Engineer*, describing their state and condition at those periods; and to which certificate it is desirable there should be a description of the particulars of the same, as far as may be practicable, in the manner and form annexed, No. 8; to be appended to the report of survey, and delivered to the Committee, who will thereupon insert in the Register Book the letters "M.C." denoting that the boilers and machinery have been inspected and certified to be in good order and safe working condition; but if no certificate of their condition be furnished by the Owner or Master, then no Character can be assigned for the machinery. (See Section 81.)

Section 79. HULL:—The Surveyors are directed to examine and report the scantling of timbers, plank, and fastenings, and to state where built, and by whom, in the same manner as directed for sailing vessels.

**Section 80.** The Surveyors are required to report the number, size, length, fastenings, and mode of arrangement of the engine and boiler *sleepers*, and the description of timber of which they are composed, and whether diagonally trussed with wood or iron, and to what extent; the length, size, and fastenings of shelf-pieces and paddle-beams; and whether the vessel be constructed with sponsons and how they are formed; and to give the length and shifting of the plank outside and inside.

# EQUIPMENT-BOILERS AND MACHINERY.

Section 81. The Surveyors are to examine and report the number and description of the masts, sails, anchors, cables, hawsers, warps and boats, as directed to be done for sailing vessels. For weight of anchors, size and length of chains, see Table No. 22 and Section 32.

The boilers and machinery are to be considered as part of the equipment, and, unless the Surveyors are satisfied of their efficiency, the Figure 1 will be withheld. (See Section 78.)

Section 82. BOATS:—The Surveyors are to be particular in examining and reporting the condition of the boats of all vessels employed in carrying passengers.

# FOREIGN BUILT SHIPS.

Section 83. Foreign Built Ships which have not been constructed in accordance with the Rules, and have not been surveyed by the Surveyors to this Society while building, for which the Owners are desirous of a character of condition or efficiency for sea-going purposes, will be surveyed for entry in the Register Book on application being made to the Committee, in writing, stating the Name of the Vessel (and if at any time she had any other name such is to be inserted in the application); likewise where and when she was built, and her length, breadth, depth, and tonnage (whether British or Foreign).

The Committee will then direct a special survey to be held by two Surveyors, to be appointed in every instance by the Committee, one of whom at least shall be an exclusive officer of the Society, and the ship will be submitted to a compliance with the undermentioned requisitions of survey or surveys; viz.:—

# SURVEY No. 1.

If the ship is less than four years old, she must be either placed in dry dock or laid upon blocks upon ways, so that the keel and bottom may be seen and properly examined.

The hold to be cleared, and proper stages to be made both inside and outside.

All air-courses, and the limbers to be cleared.

Bolts and treenails to be driven out at different parts of the ship, and in sufficient numbers to enable the Surveyors to ascertain their condition; the condition of the plank and timbers in the treenail holes also to be ascertained.

A listing of not less than four inches wide, and equal to one fifth of the length of the ship on each side to be cut out below each set of clamps or shelves in such parts as the Surveyors may require, sufficient to enable them to ascertain the size and condition of the frame.

The condition of the oakum and caulking to be ascertained.

The windlass to be unhung, and its wood lining stripped.

The Cables and general equipment to be attended to as prescribed in Sections 71 to 76, and in Table 22.

The Surveyors must then examine and report upon the ship, as to the state of the timbers of the frame (where examined), planking inside and outside, decks, waterways, beams, knees, keel, keelsons, stem, apron hawse-timbers, knight-heads, breasthooks, transoms, rudder, and windlass, the sheer and general form of the ship, particulars of materials and scantlings, so far as they can be ascertained, and spacing of timbers and beams, thickness and shifting of plank, mode of fastening, and the sizes and condition of the bolts and treenails.

# SURVEY No. 2.

If the ship is four or more years old when Surveyed, in addition to the foregoing Survey, she must be scraped bright from the light water-mark upwards, including the planksheers and waterways; the beam-ends must be examined by boring and sounding, and a listing of not less than four inches wide must be cut fore and aft below each set of clamps or shelves, and at the bilges at the discretion of the Surveyor, and a short listing outside at each buttock.

This must apply to all ships of four or more years old when Surveyed, whether they have had the short listings previously cut or not.

If after such examination all repairs are done to the satisfaction of the Surveyors, so as to enable them to make a favourable Report, a class of efficiency will be granted by the Committee, and entered in the Register Book, which class will be retained for a period not exceeding four years, subject to annual Surveys,—unless it shall be made to appear by the Owner that the ship has not been in any port during that period, where the Society has a Surveyor.

These Surveys will be noted in the Register Book, thus (S.S.No.1—72), (S.S.No.2—72), indicating the special survey and date thereof.

There will be three designations of condition or character, distinguished thus:-

1 F

2 F

3 F

- 1 F denotes ships which are found on survey to be of a superior description, fit for the conveyance of dry and perishable goods to and from all parts of the world.
- 2 F denotes ships which, although not equal to the foregoing, are nevertheless found on survey to be in a good and efficient condition, and fit for the conveyance of dry and perishable goods, on shorter voyages.
- 3 F denotes ships which shall be found on survey fit for the conveyance of cargoes not in their nature subject to sea damage.

It is to be distinctly understood that the foregoing regulations will be confined in their application to Foreign Built Ships.

These classes can be repeatedly continued for a period of four years, by the ship being subjected to the requirements of Survey No. 2, and the Annual Surveys.

To entitle the ships to Fig. 1, they must be supplied with stores in accordance with Table 22, attached to the Rules, and the general equipment attended to as prescribed in Sections 71 to 76.

LLOYD'S REGISTER OFFICE, May 30th, 1872.

# F GOOD QUALITY, PROPERLY SEASONED, AND FREE FROM DEFECTS.

E PLAN			INSIDE PLANK, &c.	THYHUS
From wo-fifths ne depth Hold to Wales.	Wales, Black- Strakes, Topsides, and Sheer- strakes.	Upper deck Waterway, Spirk'tting, and Planksh'rs.	Shelves, Clamps, Limber and Bilge Strakes, Ceiling in Hold and betwixt Decks, also Spirketting and Waterway below the Upper Deck.	2000 LENGTH HOLD SEARCH STATE AND SEARCH
14	14	14	14	East-India Teak
12	12	12	12	English, African, & Live Oak, Adriatic, Italian, Spanish, Portuguese, and French Oak; Morung Saul, Greenheart, Morra, and Iron Bark
10	10	10	12	Cuba Sabicu, Pencil Cedar, Angelly, Venatica, and Jarrah Timber
9	9	9	10	Other Continental White Oak, Mahogany of Hard Texture, Spanish Chestnut, and Blue Gum
8	8‡	7	8	North American White Oak
8	7.	7	8	Stringy Bark, and Red Cedar
9	9	10	9	Pitch Pine, Larch, Hackmatack, Tamarac, and Juniper
-36	16, 16	6	6	Second-hand English, African, and Live Oak, Adriatic, Italian, Spanish, Portu- guese, and French Oak; East-India Teak, Morung Saul, Greenheart, Morra, and Iron Bark§
8	7	. 10	8	Cowdie, Huon Pine
8	8	10	8	Dantzic, Memel, Riga, and American Red Pine
4	8) 8	-29	5	English Ash
4	1/2 1/9		5	Foreign Ash and Rock Maple
6	5	5	6†	American Rock Elmand Hickory
5	4	4	4	European and American Grey Elm
4	4	4	5	Black Birch and Black Walnut
6	6	6	6	Spruce Fir, Swedish and Norway Red Pine, and Scotch Fir.
5	4	4	5	White Cedar
4	_		5	Beech
5	5	5††	5	Yellow Pine
4	4	4	4	Hemlock

ed for Limber Strakes, Bilge Strakes, and Ceiling between them in Ships of the 8 years' grade, and under, and under

nightheads, Hawse Timbers, Aprons, Deadwood, Wales, Blackstrakes, Topsides, and Sheerstrakes, must

can Red Pine, for vessels of any class.

to the satisfaction of the Surveyors and as prescribed in Section 37 of the Rules.

[SEE OTHER SIDE.]

<sup>\*</sup> Black Birch and Spruce allowed for First Futtocks amidships, to the same extent in Ships of the 7 years' grade. and provided the Beams are well secured independently of the Waterways.

ed "English" includes Timber the growth of the United Kingdom.

point a special survey to be held thereon; and on a report being received of its being of ad than as above set forth.

# SURVEY No. 2.

If the ship is four or more years old when Surveyed, in addition to the foregoing Survey, she must be scraped bright from the light water-mark upwards, including the planksheers and waterways; the beam-ends must be examined by boring and sounding, and a listing of not less than four inches wide must be cut fore and aft below each set of clamps or shelves, and at the bilges at the discretion of the Surveyor, and a short listing outside at each buttock.

This must apply to all ships of four or more years old when Surveyed, whether they have had the short listings previously cut or not.

If after such examination all repairs are done to the satisfaction of the Surveyors, so as to enable them to make a favourable Report, a class of efficiency will be granted by the Committee, and entered in the Register Book, which class will be retained for a period not exceeding four years, subject to annual Surveys,—unless it shall be made to appear by the Owner that the ship has not been in any port during that period, where the Society has a Surveyor.

These Surveys will be noted in the Register Book, thus (S.S.No.1—72), (S.S.No.2—72), indicating the special survey and date thereof.

There will be three designations of condition or character, distinguished thus:-

1 F

2 F

3 F

- 1 F denotes ships which are found on survey to be of a superior description, fit for the conveyance of dry and perishable goods to and from all parts of the world.
- 2 F denotes ships which, although not equal to the foregoing, are nevertheless found on survey to be in a good and efficient condition, and fit for the conveyance of dry and perishable goods, on shorter voyages.
- 3 F denotes ships which shall be found on survey fit for the conveyance of cargoes not in their nature subject to sea damage.

It is to be distinctly understood that the foregoing regulations will be confined in their application to Foreign Built Ships.

These classes can be repeatedly continued for a period of four years, by the ship being subjected to the requirements of Survey No. 2, and the Annual Surveys.

To entitle the ships to Fig. 1, they must be supplied with stores in accordance with Table 22, attached to the Rules, and the general equipment attended to as prescribed in Sections 71 to 76.

LLOYD'S REGISTER OFFICE, May 30th, 1872.

TABLE A. EXHIBITING THE NUMBER OF YEARS TO BE ASSIGNED TO THE DIFFERENT DESCRIPTIONS OF TIMBER USED IN SHIPS, THE SAME TO BE OF GOOD QUALITY, PROPERLY SEASONED, AND FI

	DVIGGITU	nragna	1 117	77	1	RING.	Tuonassi	0/1			OUT	SIDE PLA	NK, Zc.		INSIDE PLANK, %c.	
	SHIPPING.	Floors.	First	Second Foothooks.	Third Foothooks and Top Timbers.	Main and Rider Keelsons.	Transoms, Knightheads, Hawse- Timbers, Apron, and Deadwood* Stem and Stern Post.	Beams and Hooks.	Knees.	Pall Bitt, Windlass, and Main Piece of Rudder.	From top of Keel to two-fifths the depth of Hold.	From two-fifths the depth of Hold to Wales.	and Sheer-	Upper deck Waterway, Spirk'tting, and Planksh'rs.	Shelves, Clamps, Limber and Bilge Strakes, Ceiling in Hold and betwixt Decks, also Spirketting and Waterway below the Upper Deck.	TAYAUS
	East-India Teak	14	14	14	14	14	14	7 <sup>d</sup> 14	14	14	14	14	strakes.	14	14	East T. 2' M. A.
-	English, African, & Live Oak, Adriatic, Italian, Spanish, Portuguese, and French Oak; Morung Saul, Greenheart, Morra, and Iron Bark	12	12	12	12	12	12	12	12	12	12	12	12	12	12	English, African, & Live Oak, Adriati Italian, Spanish, Portuguese, an
	Cuba Sabicu, Pencil Cedar, Angelly, Venatica, and Jarrah Timber	10	10	10	10	10	10	12	12	10	12				13/1 13/1/13	French Oak; Morung Saul, Greenhear Morra, and Iron Bark Cuba Sabicu, Pencil Cedar, Angelly
	Other Continental White Oak, Mahogany of Hard Texture,	9	9‡	8	8	9	8	9				10	10	10	12	Venatica, and Jarrah Timber  Other Continental White Oak
	Spanish Chestnut, and Blue Gum North American White Oak	8	81	8‡	8‡	8	Transcram		9	9	12	9	9	9	10	Mahogany of Hard Texture Spanish Chestnut, and Blue Gur
	Stringy Bark, and Red Cedar	8	8	7	7	8 12	8‡	8‡	7	8	12	8	8‡	7	8	North American White Oak
	Pitch Pine, Larch, Hackmatack.	8	8	8			7	IaA 7	7	8	12	8	7	7	8	Stringy Bark, and Red Cedar
	Tamarac, and Juniper	Taliary Po	A.P. (A	and o be	8	9	8	9	9	8	12	9	9	10	9	Pitch Pine, Larch, Hackmatack Tamarac, and Juniper
	guese, and French Oak; East-India Teak, Morung Saul, Greenheart, Morra, and Iron Bark 88	70 (.)	7 9	6	6	6	6	6	6	6		_	-	6	6	Second-hand English, African, and Liv Oak, Adriatic, Italian, Spanish, Portu guese, and French Oak; East-Indi Teak, Morung Saul, Greenheart, Morra
	Cowdie, Huon Pine	6 ¶	6	6	7	7	6	7	7		10	8	7	. 10	8	and Iron Barkee
	Dantzic, Memel, Riga, and American Red Pine	aw 7 ot a	a bm7e w	m 117/01	Mod7 bm	8	7	8	8	6	9	8	8	10	8	Cowdie, Huon Pine  Dantzic, Memel, Riga, and Amer
	English Ash	7	6	5	5	5	4	5	5	5	10	4			1	can Red Pine
	Foreign Ash and Rock Maple .	5	5	4	4	5	4	5	5		8	4			5	English Ash
	American Rock Elm and Hickory	7 9	6	5	5	7	5	7	5	5	12	6	5			Foreign Ash and Rock Maple
	European and American Grey	5	5	4	4	4	4	5	5		12			5		American Rock Elmand Hickory  European and American Grey
	Black Birch and Black Walnut	6 9	5**	4	4	4	48	4				5	4	4		Elm
	Spruce Fir, Swedish and Norway Red Pine, and Scotch Fir	6	6**	6	6	6	6	6	4	4	10	4	4	4		Black Birch and Black Walnut
	White Cedar	5	5	4	5	4	4		8	6	6	6	6	6		Spruce Fir, Swedish and Norwa Red Pine, and Scotch Fir.
	Beech	6 ¶	4	1904 Jan 19	-		4	4	5		6	5	4	4	5	White Cedar
	Yellow Pine		decemento o	heeding	Survey h	4	adismoo d	-	_	4	12	4	_	71 0	5	Beech
	Hemlock	4	of al 40880	4	4	4	4	4	4		6	5	5	5††	5	Yellow Pine
	* This Table applie	dies ody .v	dir necessas	4	4	to bus one	-Hall only	4	4	-	4	4	4	4.	4	Hemlock

od so far as regards the Material to be used from the height of two feet above the rabbet of the Keel. † American Rock Elm allowed for Limber Strakes, Bilge Strakes, and Ceiling between them in Ships of the 8 years' grade, and under.

<sup>¶</sup> Black Birch, Beech, American Rock Elm, and Cowdie, allowed for Floors in Midships, to an extent not exceeding three-fifths the entire length of the 8 years' grade, and under. \*\* Black Birch and Spruce allowed for First Futtocks amidships, to the same extent in Ships of the 7 years' grade. § Black Birch allowed for Stems and Sternposts in vessels of the 6 years' grade, and under.

<sup>++</sup> Yellow Pine allowed for Waterways of Upper Deck in Ships of the 8 years' grade, and under, if properly fastened, as prescribed in Table B, and provided the Beams are well secured independently of the Waterways. The Materials marked thus | under the head of "Rudder and Windlass," allowed in Ships of 300 Tons and under only. Mem.—The word "English" includes Timber the growth of the United Kingdom.

Lloyd's Register of Shipping, London, 11 In cases where second-hand timber of the descriptions named in line No. 8 is proposed to be used, application may be made to the Committee, who will appoint a special survey to be held thereon; and on a report being received of its being of 30th November, 1871. superior quality and of adequate size, a higher grade (not exceeding two years) may be allowed than as above set forth.

<sup>‡</sup> If the First Foothooks run up above the Light Watermark, the use of either of these Oaks will reduce Class by one year. North American White Oak for second and third Foothooks, Hawse Timbers, Aprons, Deadwood, Wales, Blackstrakes, Topsides, and Sheerstrakes, must be salted, or its use for these parts will reduce class by one year.

<sup>##</sup> The inner waterway of Upper Deck may be composed of East India Teak, Pitch Pine, Larch, Hackmatack, Dantzic, Memel, Riga, or American Red Pine, for vessels of any class. Ships built of the Timber above named, except those built wholly of Teak, will have one year added to their classification, if salted while building, provided it be done to the satisfaction of the Surveyors and as prescribed in Section 37 of the Rules.

# LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

# RULES AND REGULATIONS.

NOTICE is hereby given, that in pursuance of Resolutions passed this day by the Committee, amendments have been made in the Rules of the Society, as follows, viz.—

TREENAILS, SECTION 46.

The requirement that Treenails are to be "of a description equal to the best material through which they pass" has been modified by the addition of a footnote, to the effect, that parties desiring a modification of this requirement must make special application to the Committee in each case.

# TABLE A FOR WOODS.

JARRAH TIMBER to be entered in Table A, in line No. 3, thus rating it with Cuba Sabicu, Pencil Cedar, &c.

ROCK MAPLE to be entered in Table A, in line No. 12, thus rating it with Foreign Ash.

### STEAM POWER IN SHIPS.

STEAM POWER IN SHIPS.—The entry of "A.P." (Auxiliary Power), in the Register Book to be discontinued, and the nominal Horse Power (H.P.) to be inserted in lieu thereof.

# SALTING OF SHIPS, SECTION 37.

The Rule in respect to the Salting of Ships has been amended as regards the Salting of the keelson, and the Rule will now stand as follows, viz.—

- "One year will be added to the term of classification to which a ship may otherwise be entitled, provided that during her construction she be salted as under, viz.:—
- "The spaces between the transoms and between the timbers of the frame to be filled with salt at each end of the vessel for one-fifth her length, from the deadwood to the gunwale, and amidships from the upper part of the bilges to the gunwale. For the purpose of retaining the salt between the timbers, stops are to be introduced immediately above all the air courses, and at the upper part of the bilges.
- "The keelson is also to be cased in and salted, all fore and aft. In the case however of vessels entitled in other respects, from their wood materials, to a class not higher than 10 A where the keelson is composed of materials named in lines Nos. 1 and 2 of Table A, it will not be necessary to salt the keelson, except at the ends.
- "The beams, on which the weather-deck is to be laid, if salted, are to have a groove gouged on their upper side, except at their ends; the groove to be in width not less than one-fourth the siding of the beam, and one inch in depth, and to be filled with salt as the deck is being laid; but if not so salted, the beams, when of wood of the nine years' grade and under, of all ships to which a year has been or may be granted for "Salting" must, on the occasion of Half-time Survey, be exposed for examination by the removal of deck planking to the extent of one strake all fore and aft at each side of the ship, or to the satisfaction of the Surveyor.
- "The state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time and other Special Surveys, and if necessary, the salt is to be renewed."

Mem: The foregoing Resolution is not to apply to ships built entirely of Teak.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

2, White Lion Court, Cornhill, London, E.C., 30th November, 1871.

# TABLE C.

SIDING AND MOULDING OF BEAMS,-Sec. 41.

900	950	1050	1150	1250	1350	1500	1750	2000
$32\frac{1}{2}$	323	331/4	$33\frac{1}{2}$	$33\frac{1}{2}$	$33\frac{3}{4}$	34	$34\frac{1}{2}$	35
14	141/4	$14\frac{1}{2}$	$14\frac{3}{4}$	15	151/4	$15\frac{1}{4}$	$15\frac{1}{2}$	$15\frac{3}{4}$
13	$13\frac{1}{4}$	$13\frac{1}{2}$	$13\frac{3}{4}$	14	$14\frac{1}{4}$	$14\frac{1}{4}$	$14\frac{1}{2}$	$14\frac{3}{4}$
$12\frac{1}{2}$	123	131	$13\frac{1}{2}$	$13\frac{3}{4}$	$14\frac{1}{4}$	$14\frac{1}{4}$	$14\frac{1}{2}$	$14\frac{3}{4}$
$11\frac{1}{2}$	113	121/4	$12\frac{1}{2}$	$12\frac{3}{4}$	$13\frac{1}{4}$	$13\frac{1}{4}$	$13\frac{1}{2}$	$13\frac{3}{4}$
$10\frac{1}{2}$	103/4	$11\frac{1}{4}$	$11\frac{1}{2}$	$11\frac{3}{4}$	$12\frac{1}{4}$	$12\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{3}{4}$
$9\frac{3}{4}$	10	10	$10\frac{1}{4}$	101/2	$10\frac{3}{4}$	$10\frac{3}{4}$	11	1114
7	71/4	71/4	$7\frac{1}{2}$	73/4	81/2	81/2	834	9
14	$14\frac{1}{4}$	$14\frac{1}{2}$	$14\frac{3}{4}$	15	$15\frac{1}{4}$	151	$15\frac{1}{2}$	16
15	$15\frac{1}{4}$	$15\frac{1}{2}$	$15\frac{3}{4}$	16	161	16½	$16\frac{3}{4}$	17
16	161	161	$16\frac{3}{4}$	17	171	17½	$17\frac{3}{4}$	18
$5\frac{1}{2}$	$5\frac{3}{4}$	6	6	6	$6\frac{1}{4}$	$6\frac{1}{2}$	63/4	7
41/4	8 41/4	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	43/4	5
$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5	51/4	5½	5
$3\frac{1}{2}$	$3\frac{1}{2}$	334	$3\frac{3}{4}$	4	4	$4\frac{1}{4}$	41/2	4
$\begin{array}{c} 7\frac{1}{2} \\ 9 \end{array}$	$\frac{7\frac{1}{2}}{9}$	$\frac{7\frac{1}{2}}{9}$	$7\frac{1}{2}$ 9	8 9½	8 9 <sup>1</sup> / <sub>2</sub>	$8\frac{1}{2}$ $9\frac{1}{2}$	$8\frac{1}{2}$ $9\frac{1}{2}$	9
$2\frac{3}{4}$	$2\frac{3}{4}$	23	3	3	3	31/4	$3\frac{1}{2}$	3
5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	61	61/4	61/2	7
5	5	$5\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6
$3\frac{1}{2}$	$3\frac{1}{2}$	334	3 3 4	9 4	4	$4\frac{1}{4}$	$4\frac{1}{2}$	5
4	4	4	4	4	4	$4\frac{1}{4}$	$4\frac{1}{2}$	5
4	4	4	4	4	4	4	4	4
ft. in. 7 3	ft. in. 7 6	ft. in. 7 6	ft. in. 7 9	ft. in. 7 9	ft. in. 8 0	ft. in. 8 0	ft. in. 8 0	ft. ir
6 3	6 6	6 6	6 9	6 9	7 0	7 0	7 0	7
22	22	23	23	24	24	25	25	27

LENGTH	HOLD	BEAMS	DECK	BEAMS
OF BEAM		11. 7		
amid-	sided and		sided and	
ships.	moulded.	at ends.	moulded.	at ends.
Feet	Inches.	Inches.	Inches.	Inches.
10	_		$4\frac{1}{2}$	$3\frac{3}{4}$
11			5	4
12	_	_	5 <sup>1</sup> / <sub>4</sub>	41/4
13	111		$5\frac{1}{2}$	$4\frac{1}{2}$
14	_	_	$5\frac{3}{4}$	43
15	8	63	61/4	51/4
16	81/2	7	$6\frac{1}{2}$	$5\frac{1}{2}$
17	83	$7\frac{1}{2}$	63	$5\frac{1}{2}$
18	91/4	73	7	53
19	91/2	8	71/4	6
20	10	81/2	$7\frac{1}{2}$	61
21	$10\frac{1}{4}$	834	73/4	61/2
22	101	9	8	61
23	11	91/4	814	63
24	1114	$9\frac{1}{2}$	81/2	7
25	113	93	81/2	71/4
26	12	10	83	71/4
27	121	101/4	9	$7\frac{1}{2}$
28	$12\frac{1}{2}$	$10\frac{1}{2}$	9	$7\frac{1}{2}$
29	123	103	91	73
30	13	11	91/2	8
31	131/4	1114	91/2	8
32	$13\frac{1}{2}$	$11\frac{1}{2}$	93	81/4
33	$13\frac{3}{4}$	$11\frac{1}{2}$	10	81/4
34	14	113	10	81/2
35	141	12	$10\frac{1}{4}$	81/2
36	$14\frac{1}{2}$	$12\frac{1}{4}$	$10\frac{1}{4}$	81/2
37	$14\frac{3}{4}$	$12\frac{1}{2}$	$10\frac{1}{2}$	83
38	15	$12\frac{1}{2}$	101/2	83
39	151	$12\frac{3}{4}$	$10\frac{1}{2}$	9
40	$15\frac{1}{2}$	13	$10\frac{3}{4}$	9

N.B.—The size of Orlop Beams to be the mean of the sizes here prescribed.

the timbers to be increased in proportion. See Rules, Sec. 39.

on, may be reduced to the siding and moulding allowed for Double Floors.

th of Wales required in every case, see Section 45.

part of a ship.

gh bolts in Shelf, and in Clamp where there is no Shelf.

breadth and depth, see Rules, Secs. 39, 45, and 62.

f unusual length.

Lloyd's Register of Shipping, 25th May, 1871.

(SEE OTHER SIDE.)

# LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

# RULES AND REGULATIONS.

NOTICE is hereby given, that in pursuance of Resolutions passed this day by the Committee, amendments have been made in the Rules of the Society, as follows, viz.—

TREENAILS, SECTION 46.

The requirement that Treenails are to be "of a description equal to the best material through which they pass" has been modified by the addition of a footnote, to the effect, that parties desiring a modification of this requirement must make special application to the Committee in each case.

# TABLE A FOR WOODS.

JARRAH TIMBER to be entered in Table A, in line No. 3, thus rating it with Cuba Sabicu, Pencil Cedar, &c.

ROCK MAPLE to be entered in Table A, in line No. 12, thus rating it with Foreign Ash.

### STEAM POWER IN SHIPS.

STEAM POWER IN SHIPS.—The entry of "A.P." (Auxiliary Power), in the Register Book to be discontinued, and the nominal Horse Power (H.P.) to be inserted in lieu thereof.

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- "The spaces between the transoms and between the timbers of the frame to be filled with salt at each end of the vessel for one-fifth her length, from the deadwood to the gunwale, and amidships from the upper part of the bilges to the gunwale. For the purpose of retaining the salt between the timbers, stops are to be introduced immediately above all the air courses, and at the upper part of the bilges.
- "The keelson is also to be cased in and salted, all fore and aft. In the case however of vessels entitled in other respects, from their wood materials, to a class not higher than 10 A where the keelson is composed of materials named in lines Nos. 1 and 2 of Table A, it will not be necessary to salt the keelson, except at the ends.
- "The beams, on which the weather-deck is to be laid, if salted, are to have a groove gouged on their upper side, except at their ends; the groove to be in width not less than one-fourth the siding of the beam, and one inch in depth, and to be filled with salt as the deck is being laid; but if not so salted, the beams, when of wood of the nine years' grade and under, of all ships to which a year has been or may be granted for "Salting" must, on the occasion of Half-time Survey, be exposed for examination by the removal of deck planking to the extent of one strake all fore and aft at each side of the ship, or to the satisfaction of the Surveyor.
- "The state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time and other Special Surveys, and if necessary, the salt is to be renewed."

Mem: The foregoing Resolution is not to apply to ships built entirely of Teak.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

2, White Lion Court, Cornhill, London, E.C., 30th November, 1871.

MINIMUM DIMENSIONS OF TIMBERS, KEELSON, KEEL, PLANKING, &c.

	11	1		1	1					1	1	1														
TonnageTons	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1050	1150	1250	1350	1500	1750	2000
*Timber and Space	18	19	20	$21\frac{1}{2}$	23	$24\frac{1}{4}$	$25\frac{3}{4}$	$27\frac{1}{4}$	$28\frac{1}{2}$	30	$30\frac{1}{4}$	$30\frac{1}{2}$	31	311/4	$31\frac{1}{2}$	$31\frac{3}{4}$	321	$32\frac{1}{2}$	323	$33\frac{1}{4}$	$33\frac{1}{2}$	$33\frac{1}{2}$	$33\frac{3}{4}$	34	$34\frac{1}{2}$	35
Floors, sided and moulded at Keelson, if squared	7	$7\frac{1}{2}$	8	83	$9\frac{1}{2}$	101	11	$11\frac{3}{4}$	$12\frac{1}{4}$	13	$13\frac{1}{4}$	131/4	$13\frac{1}{2}$	$13\frac{1}{2}$	133	133	14	14	$-\frac{14\frac{1}{4}}{}$	$14\frac{1}{2}$	143	15	151/4	$15\frac{1}{4}$	151/2	$15\frac{3}{4}$
Double Floors, sided and moulded at Keelson, if squared	6	61	7	73	81/2	91/4	10	$10\frac{1}{2}$	1114	12	$12\frac{1}{4}$	$12\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{3}{4}$	$12\frac{3}{4}$	13	13	$-\frac{13\frac{1}{4}}{}$	$13\frac{1}{2}$	$13\frac{3}{4}$	14	$14\frac{1}{4}$	141/4	$-\frac{14\frac{1}{2}}{}$	$14\frac{3}{4}$
1st Futtocks, sided and moulded at Floor Heads, if squared †	6	$6\frac{1}{2}$	7	$7\frac{3}{4}$	81	83	91/4	10	$10\frac{1}{2}$	11	1114	$11\frac{1}{2}$	113	113	12	$12\frac{1}{4}$	121/4	$12\frac{1}{2}$	123	$13\frac{1}{4}$	131	$13\frac{3}{4}$	$14\frac{1}{4}$	141	$14\frac{1}{2}$	143
2nd Futtocks, sided, if squared	51/2	6	61/2	7	$7\frac{1}{2}$	8	81/2	9	91/2	10	101	$10\frac{1}{2}$	103	103	11	1114	$11\frac{1}{4}$	$11\frac{1}{2}$	113	$12\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{3}{4}$	131	$13\frac{1}{4}$	$13\frac{1}{2}$	1334
3rd Futtocks and Long Top Timbers, sided, if squared	51/2	53	6	$6\frac{1}{2}$	7	$7\frac{1}{4}$	$7\frac{3}{4}$	81/4	81/2	9	$9\frac{1}{4}$	$9\frac{1}{2}$	93	93	10	101/4	101/4	$10\frac{1}{2}$	103	1114	$11\frac{1}{2}$	$11\frac{3}{4}$	$12\frac{1}{4}$	$12\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{3}{4}$
Top Timbers (Short) sided, if squared										9	91	91/4	91/4	$9\frac{1}{2}$	$9\frac{1}{2}$	91/2	93	93	10	10	$10\frac{1}{4}$	101/2	$10\frac{3}{4}$	$10\frac{3}{4}$	11	1114
Top Timbers, moulded at heads, if squared	0.41	$4\frac{1}{2}$	43	5	058	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	6	$6\frac{1}{4}$	$6\frac{1}{4}$	61/4	$6\frac{1}{2}$	$6\frac{3}{4}$	63/4	7	7	71/4	71/4	71/2	$7\frac{3}{4}$	81/2	81/2	83/4	9
Breasthooks & Wing Transom, sided & moulded in the middle	8	81/2	9	93	101/4	$10\frac{3}{4}$	$11\frac{1}{4}$	12	$12\frac{1}{2}$	13	$13\frac{1}{4}$	$13\frac{1}{4}$	$13\frac{1}{2}$	131	133	$13\frac{3}{4}$	14	14	$14\frac{1}{4}$	$14\frac{1}{2}$	143	15	$15\frac{1}{4}$	151	$15\frac{1}{2}$	16
‡Keel, Stem, Apron, and Sternpost, sided and moulded	8	9	10	103	1114	113	$12\frac{1}{4}$	13	$13\frac{1}{2}$	14	$14\frac{1}{4}$	$14\frac{1}{4}$	$14\frac{1}{2}$	141/2	$14\frac{3}{4}$	$14\frac{3}{4}$	15	15	$15\frac{1}{4}$	$15\frac{1}{2}$	$15\frac{3}{4}$	16	161	$16\frac{1}{2}$	$16\frac{3}{4}$	17
Keelson, also the Mainpiece of Rudder from lower part of Counter upwards, sided and moulded	9	10	11	113	121/4	$12\frac{3}{4}$	$13\frac{1}{4}$	14	$14\frac{1}{2}$	15	$15\frac{1}{4}$	$15\frac{1}{4}$	$15\frac{1}{2}$	$15\frac{1}{2}$	153	$15\frac{3}{4}$	16	16	161	161/2	163	17	171/4	171/2	173	18
§Wales		$3\frac{1}{2}$	4	41/4	41/4	$4\frac{1}{2}$	$4\frac{3}{4}$	43	5	5	5	5	. 51/4	51/4	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	6	6	61/4	$6\frac{1}{2}$	63/4	7
Bottom Plank, from Keel to Wales	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	31	$3\frac{1}{2}$	$3\frac{3}{4}$	33	4	4	4	4	4	4	41/4	$4\frac{1}{4}$	41/4	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	5
Sheer Strakes, Topsides, Upper Deck Clamp where there is no Shelf fitted, and Lower Deck Clamp with a Shelf	$2\frac{1}{4}$	$2\frac{1}{2}$	3	31/4	$3\frac{1}{2}$	$3\frac{1}{2}$	33	334	4	4	4	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	43/4	43/4	5	51/4	$5\frac{1}{2}$	$5\frac{1}{2}$
Ceiling below Hold Beam Clamp		134	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	. 23/4	3	3	3	31/4	314	31/4	31/4	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	3 3 4	4	4	41/4	41/2	$4\frac{1}{2}$
¶Waterway, { Hardwood		$\frac{4}{4\frac{1}{2}}$	$\frac{4\frac{1}{2}}{5}$	$\frac{5}{5\frac{1}{2}}$	5 6	$\frac{5\frac{1}{2}}{6\frac{1}{2}}$	$\frac{5\frac{1}{2}}{6\frac{1}{2}}$	6 7	6 7½	6½ 8	$\frac{6\frac{1}{2}}{8}$	$\frac{6\frac{1}{2}}{8}$	7 8½	$\frac{7}{8\frac{1}{2}}$	$\frac{7}{8\frac{1}{2}}$	$\frac{7}{8\frac{1}{2}}$	$\begin{array}{c} 7\frac{1}{2} \\ 9 \end{array}$	$\frac{7\frac{1}{2}}{9}$	$\begin{array}{c} 7\frac{1}{2} \\ 9 \end{array}$	$\frac{7\frac{1}{2}}{9}$	$\frac{7\frac{1}{2}}{9}$	8 9½	8 9½	$8\frac{1}{2}$ $9\frac{1}{2}$	$8\frac{1}{2}$ $9\frac{1}{2}$	9
Ceiling betwixt Decks		134	2	2	$2\frac{1}{4}$	21/4	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	3	3	31/4	$3\frac{1}{2}$	$3\frac{1}{2}$
Bilge Plank, inside, Thick Strakes over long and short Floorheads, and Limber Strake	$2\frac{1}{2}$	3	31/2	33	334	4	41	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	434	5	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	61/4	61/4	$6\frac{1}{2}$	7
Lower Deck Clamp where there is no shelf fitted, and Spirketting			3	31/4	$3\frac{1}{2}$	33	4	4	$4\frac{1}{4}$	41/2	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	43	$4\frac{3}{4}$	434	5	5	5	$5\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6
Upper Deck Clamp where a shelf is also fitted	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	234	$2\frac{3}{4}$	3	3	3	31/4	31/4	31/4	31	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	334	3 3 4	9 4	4	41/4	$4\frac{1}{2}$	5
Planksheer	2	.21	21/2	$2\frac{3}{4}$	3	31/4	$3\frac{1}{2}$	$3\frac{3}{4}$	334	4	4	4	4	4	4	4	4	4	4	4	4	4	4	41/4	$4\frac{1}{2}$	5
Flat of Upper Deck (see note at side)	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	3 ]	3	3	3	31/2	$3\frac{1}{2}$	31/2	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	31/2	4	4	4	4	4	4	4	4	4
Scarphs of Keelson without Rider	ft. in. 4 6	ft. in. 4 9		ft. in. 5 3	ft. in. 5 6	ft. in. 5 10		ft. in. 6 6	ft. in. 6 9	ft. in. 7 0		ft. in. 7 0	ft. in. 7 0		ft. in. 7 3			ft. in. 7 3					ft. in. 8 0	ft. in. 8 0	ft. in. 8 0	ft. in. 8 0
Ditto, where Rider Keelson is added, also Scarphs of Keel	4 0	4 3	4 6	4 9	5 0		5 4		5 9	6 0	6 0	6 0	6 0	6 0	6 3	6 3	6 3	6 3	6 6	6 6	6 9	6 9	7 0	7 0	7 0	7 0
Main Piece of Windlass (see footnote)Inches	12	14	14	15	15	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	27

LENGTH	HOLD	BEAMS	DECK	BEAMS
BEAM amid-ships.			sided and moulded.	
Feet	Inches.	Inches.	Inches.	Inches.
10	_		$4\frac{1}{2}$	334
11	_		5	4
12	_	_	5 <u>1</u>	41/4
13	_	_	$5\frac{1}{2}$	41/2
14	_	_	53	43
15	8	$6\frac{3}{4}$	61	51
16	81/2	7	$6\frac{1}{2}$	51
17	83	$7\frac{1}{2}$	63	51
18	91	73	7	53
19	91	8	74	6
20	10	81/2	$7\frac{1}{2}$	61
21	101/4	83	73	61
22	101	9	8	61
23	11	91/4	81	63
24	1114	$9\frac{1}{2}$	81/2	7
25	113	93	81/2	71
26	12	10	83	71
27	$12\frac{1}{4}$	$10\frac{1}{4}$	9	71/2
28	$12\frac{1}{2}$	$10\frac{1}{2}$	9	71/2
29	123	$10\frac{3}{4}$	91	73
30	13	11	$9\frac{1}{2}$	8
31	131/4	1114	91/2	8
32	131/2	$11\frac{1}{2}$	93	81
33	133	$11\frac{1}{2}$	10	81
34	14	113	10	81/2
35	141	12	101	81/2
36	$14\frac{1}{2}$	121	101	81/2
37	1434	$12\frac{1}{2}$	$10\frac{1}{2}$	83
38	15	$12\frac{1}{2}$	101	83
39	151	$12\frac{3}{4}$	$10\frac{1}{2}$	9
40	151	13	103	9

N.B.—The size of Orlop Beams to be the mean of the sizes here prescribed.

Lloyd's Register of Shipping,

Moulding of Futtocks and Top Timbers to diminish gradually from size given at Floor Heads to that at Top Timber Heads. See Rule, sec. 38.

WINDLASS.—The diameter of main piece of windlasses in Steam Ships may be 7/8 of that required in the Table, provided always the body of the windlass be not of unusual length.

This Depth of Waterway for Faying Surface against Timbers is required, below the underside of the Planksheer, to receive in and out through Bolts at alternate Timbers, with alternate through bolts in Shelf, and in Clamp where there is no Shelf. Mem.—For relaxations in respect to Poops, Top-gallant forecastles, and raised quarter decks, see Rules, sec. 38. For requirements for Vessels of excessive length as compared with breadth and depth, see Rules, Secs. 39, 45, and 62.

25th May, 1871.

<sup>†</sup> When the heels of 1st Foothooks meet at the middle line on the Keel, under the Keelson, either with full moulding, or with Cross Chocks properly butted, the siding of single Floors, and their moulding at the Keelson, may be reduced to the siding and moulding allowed for Double Floors. § For Breadth of Wales required in every case, see Section 45.

The rabbet of the Keel, Stem, and Stempost to be made so as to leave sufficient substance of wood to form a substantial back rabbet. All the fore and after hoods, both outside and inside, may be reduced one-sixth in thickness. Furrens are not allowed in this or in any other part of a ship.

# SUGGESTED TABLE, B 2.

FOR THE THICKNESS OF INSIDE PLANK, &c., IN THE CONSTRUCTION OF SHIPS BUILT IN THE BRITISH NORTH AMERICAN COLONIES AND ALL FIR SHIPS WHEREVER BUILT.

TONNAGETons	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1050	1150	1250	1350	1500	1750	2000
Thick Waterwayinches	5	$5\frac{1}{4}$	$5\frac{1}{2}$	6	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$	$7\frac{1}{2}$	8	8	$8\frac{1}{2}$	$8\frac{1}{2}$	9	9	$9\frac{1}{2}$	$9\frac{1}{2}$	10	$10\frac{1}{2}$	11	11½	12	121/2	13	$13\frac{1}{2}$	14
Spirketing			3	31/4	$3\frac{1}{2}$	334	4	4	41/4	$4\frac{1}{2}$	$4\frac{1}{2}$	43/4	$4\frac{3}{4}$	$4\frac{3}{4}$	5	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	$5\frac{3}{4}$	6	61/4	$6\frac{1}{2}$	$6\frac{3}{4}$	$6\frac{3}{4}$	7
Ceiling Below Hold Beam Clamp and be-	2	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	31/4	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	334	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	5	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	$5\frac{3}{4}$	6	6
Bilge Plank (Inside)	$2\frac{1}{2}$	3	$3\frac{1}{2}$	334	4	41/4	$4\frac{1}{2}$	$4\frac{3}{4}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7	7	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	$9\frac{1}{2}$	$10\frac{1}{2}$	$11\frac{1}{2}$	12	$12\frac{1}{2}$	13	$13\frac{1}{2}$	14
Chickstuff over long and short Floorheads, and Limber Strakes	$2\frac{1}{2}$	$2\frac{3}{4}$	3	31/4	31/4	$3\frac{1}{2}$	$3\frac{3}{4}$	4	$4\frac{1}{4}$	$4\frac{1}{2}$	43/4	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	$6\frac{1}{4}$	$6\frac{1}{2}$	$6\frac{3}{4}$	7	$7\frac{1}{4}$	$7\frac{1}{2}$	$7\frac{3}{4}$	8	81/4	81/2
Main Keelsons(Rider Keelsons may be two-thirds that of main ditto.)	9	10	11	$11\frac{3}{4}$	121/4	$12\frac{3}{4}$	133/4	14	$14\frac{1}{2}$	15	151/4	$15\frac{1}{2}$	$15\frac{1}{2}$	$15\frac{1}{2}$	$15\frac{3}{4}$	$15\frac{3}{4}$	16	16	$16\frac{1}{4}$	$\frac{16\frac{1}{2}}{}$	163/4	17	$17\frac{1}{4}$	$17\frac{1}{2}$	$17\frac{3}{4}$	18

<sup>2,</sup> White Lion Court, Cornhill, 25th May, 1871.

TABLE E. NUMBER OF HANGING KNEES

								Section 41.	
400	450	500	700	900	1250		Tons.	To Hold Beams.	To Upper Deck Beams.
400	400	300		300	.1000		150	PAIRS.	PAIRS.
$1^{3}/_{16}$	$1^{4}/_{16}$	$1^{4}/_{16}$	$1^{5}/_{16}$	$1^{6}/_{16}$	18/16		200	4	6
							250	5	7
15/16	15/16	1	$1^{2}/_{16}$	$1^{3}/_{16}$	14/16	8,15,4363	300	6	8
							350	7	9
11/16	$1^2/_{16}$	$1^{2}/_{16}$	$1^{3}/_{16}$	$1^{4}/_{16}$	$1^{6}/_{16}$		400	8	10
							450	8	11
13/16	13/16	14/16	14/16	15/16	1		500	9	12
						Walleting Co.Cl. to-	550	9	13
12/16	12/16	12/16	12/16	13/16	14/16		600	10	14
							650	10	15
14/16	14/16	14/16	15/16	1	$1^{2}/_{16}$	97 1 7 1978	700	11	16
							750	11	17
$2^{3}/_{4}$	3	3	31/4	$3^{1}/_{2}$	31/2	100 A 10	800	12	18
					Liver Children		900	13	20
11/4	11/4	$1^{3}/_{8}$	$1^{3}/_{8}$	$1^{3}/_{8}$	11/2		1000	14	22
eribed in S	Section 46,	and to be	e of good	quality,	well made	e .	1100	15	24
				- "			1350	17	26
The same of the sa	13/16  15/16  11/16  11/16  12/16  14/16  23/4  11/4  rribed in S	13/16 14/16  15/16 15/16  11/16 12/16  13/16 13/16  12/16 12/16  14/16 14/16  23/4 3  11/4 11/4  wribed in Section 46,	$1^{3}/_{16}$ $1^{4}/_{16}$ $1^{4}/_{16}$ $1^{15}/_{16}$ $1$ $1^{15}/_{16}$ $1^{15}/_{16}$ $1$ $1^{1}/_{16}$ $1^{2}/_{16}$ $1^{2}/_{16}$ $1^{3}/_{16}$ $1^{3}/_{16}$ $1^{4}/_{16}$ $1^{2}/_{16}$ $1^{2}/_{16}$ $1^{2}/_{16}$ $1^{4}/_{16}$ $1^{4}/_{16}$ $1^{4}/_{16}$ $2^{3}/_{4}$ $3$ $3$ $1^{1}/_{4}$ $1^{1}/_{4}$ $1^{3}/_{8}$ wribed in Section 46, and to be graph of the section 46, and to be	$1^{3}/_{16}$ $1^{4}/_{16}$ $1^{4}/_{16}$ $1^{5}/_{16}$ $1^{5}/_{16}$ $1$ $1^{2}/_{16}$ $1^{1}/_{16}$ $1^{2}/_{16}$ $1$ $1^{2}/_{16}$ $1^{1}/_{16}$ $1^{2}/_{16}$ $1^{2}/_{16}$ $1^{3}/_{16}$ $1^{3}/_{16}$ $1^{3}/_{16}$ $1^{4}/_{16}$ $1^{4}/_{16}$ $1^{12}/_{16}$ $1^{12}/_{16}$ $1^{12}/_{16}$ $1^{12}/_{16}$ $1^{14}/_{16}$ $1^{14}/_{16}$ $1^{14}/_{16}$ $1^{15}/_{16}$ $2^{3}/_{4}$ $3$ $3$ $3^{1}/_{4}$ $1^{1}/_{4}$ $1^{1}/_{4}$ $1^{3}/_{8}$ $1^{3}/_{8}$ wribed in Section 46, and to be of good	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	13/16	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

# HE BRITISH NORTH AMERICAN

)0	950	1050	1150	1250	1350	1500	1750	2000
0	$10\frac{1}{2}$	11	11½	12	121/2	13	$13\frac{1}{2}$	14
$\frac{1}{2}$	$5\frac{3}{4}$	$5\frac{3}{4}$	6	61/4	$6\frac{1}{2}$	$6\frac{3}{4}$	$6\frac{3}{4}$	7
34	5	5	$5\frac{1}{4}$			$5\frac{3}{4}$		- and or
)	$9\frac{1}{2}$	$10\frac{1}{2}$	$11\frac{1}{2}$	12	$12\frac{1}{2}$	13	$13\frac{1}{2}$	14
$\frac{1}{2}$	$6\frac{3}{4}$	7	$7\frac{1}{4}$	$7\frac{1}{2}$		8		81/2
6	$16\frac{1}{4}$	$16\frac{1}{2}$	163/4	17.	$17\frac{1}{4}$	$17\frac{1}{2}$	$17\frac{3}{4}$	18

# TABLE D.

SIZES OF BOLTS, PINTLES OF RUDDER, AND TREENAILS.

N.B.—Bolts to be through and elenched, as prescribed in Section 46, and to be of good quality, well made with suitable heads and be tightly driven.

olice of Harrying Kasses to Hold or Lowers		1017	1	1	1	1	1						
Tonnage	50	100	150	200	250	300	350	400	450	500	700	900	.1350
Heel-Knee, Stemson, and Deadwood Bolts	14/16	15/16	1	1	11/16	$1^{2}/_{16}$	$\frac{1^{2}}{16}$	13/16	$1^{4}/_{16}$	$1^{4}/_{16}$	15/16	$1^{6}/_{16}$	18/16
Bolts in Sister Keelsons, Scarphs of Keel,* Arms of Breast Hooks, Pointers, Crutches, Riders, Hanging and Lodging Knees to Hold or Lower Deck Beams (except in and out Throat Bolts of Hanging Knees, which must be larger), also in and out Bolts of Shelf, Clamp, and Waterway of Hold or Lower Deck Beams, and the in and out Throat Bolts of Upper Deck Hanging Knees.	11/16	12/16	12/16	12/16	13/16	14/16	14/16	15/16	15/16	1	$1^{2}/_{16}$	$1^{3}/_{16}$	$1^{4}/_{16}$
Keelson Bolts (one through Keel at each Floor), Throats of Transoms, Throats of Breasthooks, and Throats of Hanging Knees to Hold or Lower Deck Beams	12/16	13/16	14/16	14/16	15/16	1	1	11/16	$1^2/_{16}$	$1^{2}/_{16}$	13/16	$1^{4}/_{16}$	16/16
Bilge, Limber Strake, and Through Butt Bolts	9/16	10/16	10/16	11/16	11/16	12/16	12/16	13/16	13/16	14/16	14/16	15/16	1
Other Butt Bolts	9/16	10/16	10/16	10/16	11/16	11/16	11/16	12/16	12/16	12/16	12/16	13/16	14/16
Bolts through heels of cant timbers at fore and after Deadwood. In and out Bolts of Upper Deck Waterway, Shelf and Clamp, also Arms of Hanging and Lodging Knees, except in and out Throat Bolts of Hanging Knees, which must be larger	10/16	11/16	11/16	11/16	12/16	13/16	13/16	14/16	14/16	14/16	15/16	1	$1^2/_{16}$
Pintles of Rudder The Lower Brace must extend so as to receive not less than Two Bolts on the Planking on each side	17/8	2	2	21/4	$2^{3}/_{8}$	$2^{1}/_{2}$	25/8	$2^{3}/_{4}$	3	3	31/4	$3^{1}/_{2}$	$3^{1}/_{2}$
Iardwood Treenails	1	1	1	11/8	11/8	11/8	11/4	11/4	11/4	13/8	13/8	$1^{3}/_{8}$	$1^{1}/_{2}$

<sup>\*</sup> NUMBER OF BOLTS IN SCARPHS OF KEEL:-

In Ships of 150 Tons and under . . . . . . . . . . 6 Bolts , These bolts to be of above 150 Tons and under 500 Tons . . . 7 do. , 500 Tons and above . . . . . . 8 do. These bolts to be of Copper or Yellow Metal in all cases.

NUMBER OF HANGING KNEES

Section 41.

TABLE E.

	Tons.	To Hold Beams.	To Uppe Deck Beams.
	150	PAIRS.	PAIRS.
	200	4	6
	250	5	7
	300	6	8
	350	7	9
	400	8	10
	450	8	11
	500	9	12
	550	9	13
	600	10	14
	650	10	15
	700	11	16
	750	11	17
	800	12	18
	900	13	20
	1000	14	22
	1100	15	24
	1350	17	26
,		-	

	8		
針			Breadth of Upper Deck Knees, where there are two Decks and of Middle Deck Knees, where there are three Decks

Ners .- The Bolts in all Iron Riders in Hold to be not more than two

† Brendth and thioloness of Knees for Upper Dock.

Side Arms of Handing Knees not to be less in length, then one and a half the

TABLE F.

MINIMUM DIMENSIONS OF IRON KNEES AND KNEE RIDERS FOR BRITISH NORTH AMERICAN BUILT SHIPS AND FIR SHIPS.—Section 62

					1	1			1		1	1	Auc	)	POILL	SHIPS	AND	FIR SI	HIPSS	Section 62.						
Tonnage	150	200	250	300	350	400	450	500	550	600	650	700	750	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	200
Number of Hanging Knees to Hold or Lower Deck Beams	3*	4	6	8	9	Upwar	ds, one	Knee R	ider to	every B	eam, or	Knees	and Ri	ders as	per Sec	tion 62.										
Number of Hanging Knees to Upper and Middle Deck Beams	4	6	7	8	9	10	11	12	13	14	15	16	17	18	Upwar	ds, one	to ever	y Beam								
Breadth of Knees and Riders to Hold or Lower Deck Beams	3	3	3	3	3	3	$3\frac{1}{4}$	31/4	31/2	31/2	33	334	4	4	414	41/4	$4\frac{1}{2}$	41/2	43	43	5	5	$-\frac{5\frac{1}{4}}{}$	51/4	$5\frac{1}{2}$	$5\frac{1}{2}$
Breadth of Upper Deck Knees, where there are two Decks, and of Middle Deck Knees, where there are three Decks	3	3	3	3	3	3	31/4	$3\frac{1}{4}$	$3\frac{1}{2}$	31/2	$3\frac{1}{2}$	31/2	334	334	4	4	$4\frac{1}{4}$	$-\frac{4\frac{1}{4}}{}$	41/2	41/2	41/2	41/2	434	434	434	434
Thickness of Riders at the joints or butts of the Timbers	$1\frac{1}{4}$	11/4	$1\frac{1}{2}$	11/2	11/2	$1\frac{1}{2}$	134	134	2	2	$2\frac{1}{4}$	21/4	$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{2_{3}}{4}$	23/4	3	3	$3\frac{1}{4}$	31/4	3½	31/2	31/2	31/2	$3\frac{3}{4}$	33
Thickness of Knees to Lower Deck or Hold Beams and Knee Riders at the Angle of the Throat	$2\frac{1}{2}$	$2\frac{1}{2}$	$2rac{3}{4}$	$2\frac{3}{4}$	3	3	31	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	33	33	4	4	$-\frac{4\frac{1}{4}}{}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	43	43	5	5	51/4	$5rac{1}{4}$	$5\frac{1}{2}$	51/2
Thickness of Knees to Lower Deck or Hold Beams and Knee Riders at the Throat Bolts	134	134	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2rac{1}{2}$	$2rac{3}{4}$	$2rac{3}{4}$	23	$2rac{3}{4}$	3	3 .	3	3	31/4	31	31/4	$3\frac{1}{4}$	31/2	31/2	3½	31/2	33	334
Thickness of Knees to Upper or Middle Deck at the Throat Bolts †	11/2	1 1/2	13/4	13/4	2	2	214	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	3	3	3	31	314	31	31	31/2	31/2
Thickness of Hanging Knees (not Riders) at the ends	558	5)80	34	34	34	34	7 8	78	7 8	7 8	1 .	1	1	1	1	1	1	I	1	1	1	1	1	1	1	1
Length of Beam Arms of Knees and Knee Riders for Lower Deck or Hold Beams ‡	ft. in. 2 6	ft. in. 2 6	ft. in. 2 9	ft. in. 2 9	ft. in. 3 0	ft. in. 3 0	ft. in. 3 3	ft. in. 3	ft. in. 3 3	ft. in. 3 6	ft. in. 3 6	ft. in. 3 6	ft. in. 3 9	ft. in. 3 9	ft. in. 3 9	ft. in. 3 9	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in. 4 0	ft. in 4 0

Note.—The Bolts in all Iron Riders in Hold, to be not more than twenty-one inches apart on the average.

Standards upon the Beams of such Ships are not admitted as substitutes for Hanging Knees below them.

For sizes of Bolts, see Table D.

\* Provided the depth of hold be 13ft. or upwards.

† Breadth and thickness of Knees for Upper Deck, where there are Three Decks, may be one sixth less.

‡ Beam Arms of U

‡ Beam Arms of Upper and Middle Deck Knees, may be three inches shorter than those of the Lower Deck.

Side Arms of Hanging Knees not to be less in length, than one and a half the length of their Beam Arms.

Beam Arms of Knees and Knee Riders, which are 3ft. 6in. in length, to have not less than Four Bolts; and shorter than that length, to have not less than Three Bolts.

Lloyd's Register of Shipping,

Side Arms of all Hanging Knees to have at least One Bolt more than in the Beam Arms.

Side Arms of all Hanging Knees to have at least One Bolt more than in the Beam Arms.

	8		
針			Breadth of Upper Deck Knees, where there are two Decks and of Middle Deck Knees, where there are three Decks

Ners .- The Bolts in all Iron Riders in Hold to be not more than two

† Brendth and thioloness of Knees for Upper Dock.

Side Arms of Handing Knees not to be less in length, then one and a half the

# INDEX

TO

# RULES FOR THE BUILDING AND CLASSIFICATION OF STEAM AND SAILING VESSELS BUILT OF IRON.

Section.		Section.	
13.	Beams.	19.	Plating.
14.	—— Spacing of.	44.	Poops.
34.	Bitts.	31.	Ports, freeing.
1.	Breadth.	5.	Posts, Stern and Propeller.
22.	Bulkheads.	38.	Pumps.
20.	Butt Straps.	45.	Quarter Decks, Raised.
25.	Ceiling.	40.	Reports on Vessels.
35.	Cement.	21.	Riveting and Rivets.
33.	Chain Plates.	36.	Rudder.
30.	Coal Bunker Pipes and Lids.	5.	—— Braces.
18.	Crutch Plates.	2.	Scantlings.
23.	Decks (also page 44).	31.	Scuppers.
23.	—— Fastenings.	19.	Sheerstrakes.
1.	Depth.	29.	Skylights.
24.	Double Bottoms.	27.	Sluice Valves.
26.	Engine Space.	5.	Stem.
29.	——— Trunks.	16.	Stringers on Ends of Beams.
39.	Equipment.	12 &	z 16. Stringer Angle Iron.
7.	Floor-Plates.	10 1	2, & 14. Stringers in Hold.
44.	Forecastle.		Surveys, Special and Periodical, se
6.	Frames.		pages 43, 44, 45, also 72 to 75.
6.	—— Spacing of.	17.	Tie Plates.
8.	—— Reversed.	27.	Valves and Cocks.
28.	Hatchways.	43.	Vessels, Awning Decked.
18.	Hooks.	46.	—— of Extreme Dimensions.
3.	Iron, Quality of.	47.	— not Built under Survey.
5.	Keel.	42.	—— Spar Decked.
9, 1	0, 11, & 12. Keelsons.	41.	—— Three Decked.
	Length.	32.	Ventilators.
		7.	Watercourses.
	Panting, to prevent.	37.	Windlass.
	Partners, Mast.	4.	Workmanship.
	Pillars.		

# RULES

FOR

# THE BUILDING AND CLASSIFICATION OF STEAM AND SAILING VESSELS BUILT OF IRON.

All vessels will be classed  $\bigwedge$  with a Numeral prefixed, so long as, on careful annual and periodical Special Surveys, they are found to be in a fit and efficient condition to carry dry and perishable cargoes to and from all parts of the world.

100 A, and 90 A, and 80 A, will denote vessels that have been built in accordance with, or equal to the Rules, and Tables G 1, G 2, G 3, and G 4. Deviations from the Rules will be allowed, provided that the midship section, &c., in each case, showing the proposed scantlings and arrangements, be *first* submitted through the resident Surveyors, and approved by the Committee; and that the vessels be built in accordance with the approved plans, under the Survey of the Surveyors of this Society.\*

Vessels which do not fulfil all the requirements for the 100 class, but which are superior to those built on the 90 scale, may, if the Committee think fit, be classed 95 ; those not equal to the 90 , but superior to the 80 , may be classed 85 ; and those which in some respects are deficient of the requirements of the 80 scale, but fit for the class, may be classed 75 .

Vessels not considered eligible for either of the foregoing numerals may, if found fit, be classed  $\bigwedge$  for river or similar purposes only.

N.B.—It is to be distinctly understood that the numerals prefixed to the letter  $\bigwedge$  do not signify terms of years, but are intended for the purpose of comparison only; the  $\bigwedge$  character assigned being for an indefinite veriod, subject to annual and periodical Surveys as follow.

All vessels to be submitted to occasional or annual Surveys when practicable. To entitle them to retain their characters in the Register Book, the following Special Surveys must be held periodically. At the time of any survey, the comparative numeral will depend on the thickness of the plating and angle iron, and the general condition of the vessel.

Survey No. 1.—The vessel to be placed on blocks of sufficient height, in a dry dock, or on ways;

<sup>\*</sup> In vessels building, or to be built, under contract for classification, deviations from the Rules will not be allowed by the Committee, unless the Builder previously obtains the sanction of the Owner.

the limber boards, and ceiling equal to one strake fore and aft on each side removed, § and both surfaces of outside plating exposed.\*

Survey No. 2.—The vessel to be placed on blocks of sufficient height, in a dry dock, or on ways; the limber boards, and ceiling equal to *three* strakes fore and aft on each side removed, § and both surfaces of outside plating exposed.\*

The windlass at this and all subsequent alternate surveys to be unhung, and its wood lining stripped, for the examination of the main piece and its general efficiency. The chain cables are also to be ranged on deck for inspection.

Survey No. 3.—To be held by two Surveyors, one to be an Exclusive Officer of the Society.—The vessel to be placed on blocks of sufficient height, in a dry dock, or on ways; proper stages to be made, and the hold to be cleared, all the close ceiling in the hold to be removed, so that the rivets and plates of keel, and flat of bottom, may be thoroughly examined; coal bunkers of steam vessels to be cleared, the whole of the frames, stringers, hooks, floor plates, keelsons, engine and boiler bearers,† ends of beams, water-tight bulkheads, rivets, and inner surface of the plating to be exposed;† all oxidation to be removed by being cut or beaten off the several parts above named, also from the outside plating, rivets, keel, stem, sternpost, and rudder; the planksheers and waterways, if of wood, to be scraped bright. When the vessel is thus prepared, the Surveyors are to ascertain the thickness of the plating, by drilling in such parts as they may deem necessary.\*

Such parts as may be found defective, or less than three-fourths of the required substance by Rule, are to be removed, and replaced with proper materials, equal in substance and quality to the original construction. The planksheers, waterways, flat of decks, and their fastenings, are also to be examined, and made good where necessary.‡

Upper decks must be renewed when reduced in thickness as follows, viz.:—When a deck originally 4 inches thick is worn to 3 inches,  $3\frac{1}{2}$  inches to  $2\frac{3}{4}$  inches, 3 inches to  $2\frac{1}{2}$  inches.

Vessels which have undergone either of the foregoing examinations, will be noted in the Register Book, thus s.s.No.1-72, s.s.No.2-72, s.s.No.3-72, indicating the special survey and date thereof, and if not submitted to such survey, will be liable to have their characters suspended.

Every vessel which has been classed from 100 A to 90 A, inclusive, must be submitted to a special

- \* In cases where the inner surface of the bottom plating is coated with cement, or asphalte, if the coating be carefully inspected and tested, by beating or chipping, and found sound and adhering satisfactorily to the iron, its removal may be dispensed with.
- § In the case of vessels fitted with double ceiling, application may be made to the Committee if any relaxation be required.
- † Whenever the engines or boilers are taken out, the bearers, with the floor-plates, keelsons, rivets, &c., under them, may, at the request of the Owners, be surveyed in anticipation of the above Rule.
- ‡ To facilitate the arrangements of Owners, a portion only of the requirements of the foregoing special surveys may be complied with at the expiration of the time specified, provided that the whole of the survey be completed within twelve months. The Surveyors in such cases are to give the Owners, or their agents, written notice of the parts not surveyed, and are also to report the same to the Committee.

periodical survey every four years;—the first according to No. 1; the second according to No. 2; the third according to No. 3; and afterwards according to No. 1 and No. 3, alternately, at intervals of four years.

Vessels classed 85 A and under, must be subjected to a special survey every three years, as per Nos. 1, 2, 3, and afterwards as per Nos. 1 and 3 alternately.

Whenever the bottom plating is to be cemented, a survey is to be held prior to the cement being laid.

### SURVEYS WHILE BUILDING.

### SPECIAL SURVEY.

The Surveyors are to examine during the progress of a vessel, the materials and workmanship, from the laying of the keel to her completion; and to point out as early as possible anything that may be objectionable.

### ORDINARY SURVEY.

- 1st. On the several parts of the frame, when in place complete, and before any plating is wrought.
- 2nd. On the plating, during the progress of riveting.
- 3rd. When the beams are in and fastened, before the decks are laid.
- 4th. When the vessel is complete, but before the plating is finally coated or cemented.
- 5th and last, After the vessel is launched and equipped.

# RULES FOR THE BUILDING OF IRON VESSELS.

Section 1. The scantlings given in Tables G 1, G 2, G 3, and G 4, are intended for vessels the length of which does not exceed eight times their moulded breadth, or eleven times their depth, from top of keel.

For vessels exceeding these proportions, see Sect. 46.

The measurements for regulating the proportions are to be taken as follows:-

### LENGTH.

The length to be measured from the after part of the stem to the fore part of the stern-post, on the range of the upper deck beams, in one, two, and three-decked vessels, but on the range of middle deck beams in spar-decked vessels and awning-decked vessels.

In vessels where the stem forms a cutwater, the length is to be measured from the place where the upper deck beam line would intersect the after edge of stem if it were produced in the same direction as the part below the cutwater.

#### BREADTH.

The breadth is in all cases to be the greatest moulded breadth of the vessel.

### DEPTH.

The depth in one and two-decked vessels is to be taken from the *upper part of the keel* to the top of the upper deck beam amidships. In spar-decked vessels and awning-decked vessels, the depth is to be taken from the *upper part of the keel* to the top of the main or middle deck beams amidships. For three-decked vessels, see Sect. 41.

### SCANTLINGS.

Section 2. The scantlings of the frames, reversed frames, and floor-plates, the thickness of bulk-heads and the diameter of pillars in Table G 1, are regulated by numbers, which are produced as follows:—

For one and two-decked vessels.—The number is the sum of the measurements in feet, arising from the addition of the half-moulded breadth of the vessel amidships, the depth from the upper part of the keel to the top of the upper deck beams, and the girth of the half midship frame section of the vessel, measured from the centre line at top of keel to the upper deck stringer plate.

For three-decked vessels.—The number is produced by the deduction of seven feet from the sum of the measurements taken to the top of the upper deck beams; see Sect. 41.

For spar-decked vessels and awning-decked vessels.—The number is the sum of the measurements in feet, taken to the top of the main or middle deck beam, as described for those having one or two decks; see Sects. 42 and 43.

The scantlings of the keel, stem, sternposts, the thickness of the outside plating; keelson and stringer plates, and deck, also the scantlings of the angle irons on beam stringer plates, and keelson and stringer angle irons in hold, as in Tables G 1 and 2, are governed by the number obtained by multiplying that which regulates the size of the frames, &c., by the length of the vessel.

# QUALITY OF IRON.

Section 3. The whole of the iron to be of a good malleable quality, to be subjected to tests at the discretion of the Surveyors. Brittle or inferior material to be rejected.

All plate, beam, and angle iron to be legibly stamped in two places with the manufacturer's name or trade mark, and the place where made, which is also to be stated in the report of survey.

### WORKMANSHIP.

**Section 4.** The workmanship to be well executed, and submitted to the closest inspection, and amended where necessary before coating or painting: it is not intended to prevent the coating of the plates *inside* in the way of the frames.

# KEEL, STEM, STERN, AND PROPELLER POSTS.

**Section 5.** The keel, stem, stern, and propeller posts are to be either scarphed or welded together, and to be in size according to Table G 1; if scarphed, the length of scarphs to be nine times the thickness given in the table for keels; and the rivet holes required in the thin ends of them are recommended to be drilled after the scarphs are fitted.

Where the garboard strakes are thicker than required by the Rules, the thickness of the keel may be proportionately reduced.

Where the keel and keelsons are made of several thicknesses of plates, the plates that form the keel to be in thickness, taken together, the same as is required for a solid keel, as per Table G 1; and the butts of the several plates of which the keel is formed to be carefully shifted from each other.

When hollow or flat keel plates are adopted, their breadth must be the same as given for the garboard strakes, and their thickness not less than once and a third that prescribed for those strakes, for three-fifths the

vessel's length amidships. The plates before and abaft this length may be gradually reduced to the thickness of the garboard strakes amidships.

The butt-straps of flat keel plates are to be one sixteenth of an inch thicker than the plates they connect, and treble riveted.

The stem at its lower part is to be the same moulding as the keel, and attached to it by a scarph of the same length as the keel scarph; it may be gradually reduced from the height of the load-line, to its head, where it may be three-fourths of the sectional area given in Table G 1.

The stern and propeller posts, and after end of keel, for single screw propelled vessels, to be double the thickness, or twice the sectional area, prescribed for sternposts in the Table, the portion adjoining the keel to be tapered fair into it. In a sailing vessel, or paddle steamer, the sternpost may be reduced from the lower part of the rudder trunk to its head, where it may be three-fourths of the sectional area given in the Table; and in a steam vessel having a propeller frame, it may be reduced at the head to the size required for sailing vessels.

The portion of the forging of the stern frame, forming part of the keel, is to extend sufficiently forward for the after end of its scarph in sailing vessels and paddle steamers to be at least once and a half the frame space before the sternpost, and in screw propelled vessels, at least twice and a half the frame space before the propeller post.

The rudder braces are recommended to be forged on to the sternpost.

### FRAMES.

Section 6. The frames to be of the dimensions set forth in Table G 1; to be in as great lengths as possible, fitted close on to the upper edge of the keel; and in one, two and three decked vessels, to extend to the gunwale. For spar-decked vessels, and awning-decked vessels, see Sections 42 and 43. Where either raised quarter decks, poops, or forecastles, are constructed, the frames are to extend to their deck stringers respectively, except when constructed of a rounded form at the gunwale; they may then terminate at the lower part of the curve.

When the frames are butted on the keel (except when centre through-plate keels are adopted) they are to have not less than three feet lengths of corresponding angle iron, fitted back to back, to cover and support the butts and receive the plating for at least three-fourths the vessel's length amidships. Similar pieces of angle iron are to be fitted if the frames are butted elsewhere.

The rivet holes to be punched through from the faying surfaces of the frames. It is recommended that holes be not punched in the frames at the turn of the bilge until they are bent to the required shape; holes in way of the lands of the plating to be drilled after the plating is wrought.

The spacing of the frames from centre to centre to range from twenty-one to twenty-four inches, according to the size of the vessel, see Table G 1.

### FLOOR PLATES.

Section 7. The floor-plates to be in size at the middle line according to Table G 1, for half the length amidships, excepting under the engines and boilers in steam vessels, where they must be one-sixteenth of an inch thicker. They are to be moulded not less than one-half their midship depth\* at a distance of three-

<sup>\*</sup> In vessels of unusual form, in which it may be considered desirable to depart from this condition, the approval of the Committee must be obtained thereto.

### SCANTLINGS.

Section 2. The scantlings of the frames, reversed frames, and floor-plates, the thickness of bulk-heads and the diameter of pillars in Table G 1, are regulated by numbers, which are produced as follows:—

For one and two-decked vessels.—The number is the sum of the measurements in feet, arising from the addition of the half-moulded breadth of the vessel amidships, the depth from the upper part of the keel to the top of the upper deck beams, and the girth of the half midship frame section of the vessel, measured from the centre line at top of keel to the upper deck stringer plate.

For three-decked vessels.—The number is produced by the deduction of seven feet from the sum of the measurements taken to the top of the upper deck beams; see Sect. 41.

For spar-decked vessels and awning-decked vessels.—The number is the sum of the measurements in feet, taken to the top of the main or middle deck beam, as described for those having one or two decks; see Sects. 42 and 43.

The scantlings of the keel, stem, sternposts, the thickness of the outside plating; keelson and stringer plates, and deck, also the scantlings of the angle irons on beam stringer plates, and keelson and stringer angle irons in hold, as in Tables G 1 and 2, are governed by the number obtained by multiplying that which regulates the size of the frames, &c., by the length of the vessel.

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Where the garboard strakes are thicker than required by the Rules, the thickness of the keel may be proportionately reduced.

Where the keel and keelsons are made of several thicknesses of plates, the plates that form the keel to be in thickness, taken together, the same as is required for a solid keel, as per Table G 1; and the butts of the several plates of which the keel is formed to be carefully shifted from each other.

When hollow or flat keel plates are adopted, their breadth must be the same as given for the garboard strakes, and their thickness not less than once and a third that prescribed for those strakes, for three-fifths the

vessel's length amidships. The plates before and abaft this length may be gradually reduced to the thickness of the garboard strakes amidships.

The butt-straps of flat keel plates are to be one sixteenth of an inch thicker than the plates they connect, and treble riveted.

The stem at its lower part is to be the same moulding as the keel, and attached to it by a scarph of the same length as the keel scarph; it may be gradually reduced from the height of the load-line, to its head, where it may be three-fourths of the sectional area given in Table G 1.

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**Section 6.** The frames to be of the dimensions set forth in Table G 1; to be in as great lengths as possible, fitted close on to the upper edge of the keel; and in one, two and three decked vessels, to extend to the gunwale. For spar-decked vessels, and awning-decked vessels, see Sections 42 and 43. Where either raised quarter decks, poops, or forecastles, are constructed, the frames are to extend to their deck stringers respectively, except when constructed of a rounded form at the gunwale; they may then terminate at the lower part of the curve.

When the frames are butted on the keel (except when centre through-plate keels are adopted) they are to have not less than three feet lengths of corresponding angle iron, fitted back to back, to cover and support the butts and receive the plating for at least three-fourths the vessel's length amidships. Similar pieces of angle iron are to be fitted if the frames are butted elsewhere.

The rivet holes to be punched through from the faying surfaces of the frames. It is recommended that holes be not punched in the frames at the turn of the bilge until they are bent to the required shape; holes in way of the lands of the plating to be drilled after the plating is wrought.

The spacing of the frames from centre to centre to range from twenty-one to twenty-four inches, according to the size of the vessel, see Table G 1.

### FLOOR PLATES.

Section 7. The floor-plates to be in size at the middle line according to Table G 1, for half the length amidships, excepting under the engines and boilers in steam vessels, where they must be one-sixteenth of an inch thicker. They are to be moulded not less than one-half their midship depth\* at a distance of three-

<sup>\*</sup> In vessels of unusual form, in which it may be considered desirable to depart from this condition, the approval of the Committee must be obtained thereto.

quarters the half breadth of the vessel set out from the middle line on the run of the frame, and not less at their extreme ends than the moulding of the frames; and they are to extend in a fair curve well up the bilges, in no case terminating lower at the outside of the frame than a perpendicular height of twice the midship depth of floor above the top of keel. The ends of the floors to maintain the height prescribed, for one quarter of the vessel's length amidships, they may then be gradually lowered forward and aft until the upper edges of the floor-plates are level (this place to be determined by the form of the vessel), from which to her ends they are to be gradually increased in depth, so as to efficiently connect her sides; the upper parts of the floors forward and aft are to be high enough to give ample room between the reversed frames, on each side of the vessel, for fitting the keelson angle irons.

The floor plates, if increased one-sixteenth of an inch in thickness above that specified in the Table, may be reduced in depth in the same proportion, provided their sectional area at the middle line be not less than if the sizes prescribed in the Table were adhered to. Their height at the bilges is to be equal to that which would be required if the depth given in Table were adopted.

The thickness of the floor-plates for half the vessel's length amidships to be as given in Table; but for one quarter of her length at each end, they may be reduced in thickness one-sixteenth of an inch when the plates amidships are five-sixteenths and above; and when the plates amidships are nine-sixteenths in thickness, and above, they may be reduced one-sixteenth of an inch for an eighth of the vessel's length before and abaft the half-length amidships, and the remainder may be two-sixteenths of an inch less in thickness than the midship floors.

A floor-plate to be fitted and riveted to every frame, and to be extended across the middle line, except where a vertical centre-plate is adopted, in which case the floor-plates are to be efficiently connected to it on each side by double vertical angle irons of not less size than the reversed frames.

When floors are made in two lengths, the butts are to be well fitted; and when double butt-straps are adopted, double riveting will be admitted; but where single butt-straps are used, or the floor-plates lapped, the same to be treble riveted.

Watercourses are to be formed above the frames through all the floor-plates, on each side of the middle line, and at the lower turn of the bilges in vessels of full form, and also through the vertical centre-plate, and intercostal keelsons, when such keelsons are adopted, so as to allow water to reach the pumps freely.

Floor plates to which the bulkheads are attached must be deeper than the adjacent floor plates, to admit of the bulkheads being riveted to them above the reversed angle irons.

Transom-plates are to be fitted and connected to the frames, and to the sternpost where practicable, so as to efficiently support the counter.

# REVERSED ANGLE IRONS ON FRAMES.

Section 8. Reversed angle-irons on frames to be in size as per Table G 1, and to be double from bilge to bilge in engine space, and in way of keelsons and stringers in hold.

Vessels where the number for regulating the size of the frame is below 52, to have reversed angle irons riveted to every frame and floor-plate, extending across the middle line to the upper part of bilges.

Vessels where the number, as per Rule, is 52 and below 61, to have reversed angle irons riveted to every alternate frame and floor-plate, extending across the middle line to the upper part of bilges, and on the remaining frames and floor-plates to the upper deck beam stringer.

Vessels where the number, as per Rule, is 61 and upwards, to have reversed angle iron on every alternate frame and floor plate, extending across the middle line to the upper part of the lower deck or hold beam stringer angle irons, when the vessel has two decks or tiers of beams, or if spar decked, or if awning decked; but to the upper part of middle deck beam stringer angle iron if she be "three decked." On the remaining frames and floor-plates, the reversed angle iron is to be carried across the middle line, to the height of upper deck beam stringer, in one, two, and three-decked vessels; but only to the upper part of the main or middle deck beam stringer angle iron in spar-decked vessels, and to the main deck stringer plate in awning-decked vessels.

The butts of reversed angle irons, excepting those at middle line, to be secured with butt straps, having not less than two rivets on each side of the butt.

The rivets for securing the reversed angle iron to the frames and floor-plates to be in diameter in proportion to the greatest thickness of angle, or plate iron, through which they pass, as specified in the Table for the outside plating, and to be spaced from seven to nine times their diameter, from centre to centre.

# MIDDLE LINE KEELSONS. MIDDLE LINE SINGLE PLATE KEELSON.

Section 9. The middle line keelson, if of single plate, and standing above the floor-plates, to be of the size prescribed in Table G 2, and to have angle irons, of the dimensions given in the same Table, fitted and riveted on its upper and lower edges. There is to be a rider plate, on the top of the keelson plate, extending over three-fourths of the length of the vessel amidships, riveted to the angle irons, the breadth of which is to be the sum of the flanges of the angle irons and the thickness of centre plate it covers; the thickness of the rider plate to be as prescribed in Table G 2. The butts of the plates and angle irons forming this keelson to be properly shifted, and to be efficiently butt strapped.

The butts of the vertical plate to be secured with double butt straps, each not less than two-thirds of the thickness of the plates they connect, and to be treble riveted; the butt straps of the rider plate to be fitted on the upper side, to be a sixteenth of an inch thicker than the plates they connect, and to be treble riveted; the butt straps of the angle irons to have not less than three rivets on each side of the butt.

# MIDDLE LINE BOX KEELSON.

If a box keelson be adopted, it is to be formed of plates, properly shifted, of the thickness given in Table G 2, with a foundation plate; the depth to be the same as that prescribed for single plate keelsons; the angle irons to be of the size given in Table G 2. The box is to maintain its depth for half the vessel's length amidships, it may then be gradually reduced to two-thirds of the same at the extreme ends.

# MIDDLE LINE INTERCOSTAL KEELSON.

If a middle line intercostal keelson be adopted, the plates are to be of the thickness prescribed in Table G 2, and riveted to vertical angle irons of not less size than the reversed frames, to be fitted and attached to all floorplates; the intercostal plates to extend from the keel to the top of the floors, and to be fitted close to them. A bulb plate of not less thickness than the intercostal plates, or plate of equal strength, to be let down below the tops of the floors, between the reversed angle irons, sufficiently for the intercostal plates to be riveted thereto; this plate to be fitted between and riveted to two longitudinal angle irons on the floors, extending

all fore and aft, of the size given for keelson angle irons in Table G 2; or the letting down of the bulb plate may be dispensed with, if the intercostal plates are extended to the upper edge of the longitudinal angle irons.

In vessels where the number for plating exceeds 24,000, instead of a bulb-plate there must be a centre vertical plate keelson, of the thickness given in Table G 2, attached to the intercostal plates, with double angle irons and a rider plate on its upper edge, and in addition, double angle irons are to be fitted on the floor-plates; or a keelson of any other approved plan may be fitted.

Where flat plate keels are used, the intercostal keelson plates, or centre through-plates, are to be fitted close down on the keel, and connected to it by double angle irons of the dimensions given for keelson angle irons in Table G 2, riveted all fore and aft to the keel and keelson.

# CENTRE THROUGH-PLATE KEEL AND KEELSON.

If the middle line keelson be formed of a centre through-plate, extending from the lower edge of the keel to the top of the floors, it must be two-sixteenths of an inch thicker than that required in Table G 2 for intercostal keelsons. To strengthen the floor-plates transversely at their intersection at the middle line, in addition to the double vertical angle irons riveted to their ends and to the centre plate keelson, there is to be a flat keelson plate, of the same thickness as, and not less than three-fourths the breadth of, the garboard strakes in Table G 1, riveted to double reversed angle irons on the upper edge of floors, and to two fore and aft angle irons on the upper edge of the centre through-plate keelson. But should the centre through-plate keelson be extended above the upper edge of the floors, then it is to be connected by two fore and aft angle irons, of the size given in Table G 2, to two flat plates, one on each side of the middle line, to be one-sixteenth of an inch thicker than that given for intercostal plates, and one-third the breadth of the garboard strakes, to be well riveted to the double reversed angle irons on the upper edge of the floors.

In all cases the middle line keelson is to be extended as far forward and aft as practicable.

# BILGE KEELSONS, AND STRINGERS IN HOLD.

Section 10. All vessels to have bilge keelsons, extending all fore and aft, and placed at the lower turn of the bilges, formed of double angle irons fitted back to back, of the size given in Table G 2.

If the vessel have but a single tier of beams and her number in Table G 2 is under 8,900 a side stringer, formed of the same size angle irons, is to be fitted between the bilges and upper deck, extending all fore and aft.

In vessels, where the number in Table G 2 is 8,900 and upwards, and not of a depth requiring hold beams or stringer plates in lieu thereof, two pairs of double angle iron stringers are to be fitted between the bilge keelsons and the deck beams, the upper pair to extend all fore and aft, the lower pair to extend over half the vessel's length amidships, to be riveted back to back and to double reversed angle iron on the frames; the size of them not to be less than those used for the middle line keelson.

For stringers in hold, see also Sect. 14.

# SIDE KEELSONS.

Section 11. In vessels where the number in Table G 2 is 13,100, and under 15,500, a double

angle iron keelson is to be fitted on each side, as far forward and aft as practicable, and to be placed about midway between the middle line and bilge keelsons.

Where the number is 15,500, and under 18,700, intercostal plates are to be fitted on each side, as far forward and aft between the floors as practicable, and to be placed about midway between the middle line and bilge keelsons; these plates are to be fitted close to the floors, to which they are to be attached by angle irons of the size of the reversed frames; they are to extend to the top of the floors, and longitudinal plates, in long lengths of the same thickness as the intercostal plates, are to be let down and riveted to them. These plates are to be fitted between and riveted to two longitudinal angle irons of the size given for keelson angle irons; or the longitudinal plates may be dispensed with if the intercostal plates are extended to the upper edge of the longitudinal angle irons and riveted to them.

Where the number is 18,700 and above, intercostal plates are to be fitted as previously described; and, in addition, they are to be attached to the outside plating by fore and aft angle irons of not less size than  $3 \times 3 \times \frac{7}{16}$ .

Intercostal plates or side keelsons need not be fitted in the range of double bottoms.

Vessels not being of a size to require side intercostal keelson plates are to have washplates, or boards, fitted between the middle line and bilge keelsons, for not less than half the vessel's length amidships.

## DETAILS RELATING TO KEELSONS AND STRINGERS.

Section 12. Where bulb iron is used for keelsons or stringers, the joints to be overlapped and riveted, or otherwise efficiently connected; if overlapped, the length of lap must not be less than twice the depth of the bulb plate; iron of other form than bulb may be used for them, if of equal strength.

All angle irons for keelsons and stringers are to be in long lengths, properly shifted; and wherever butted to be connected with angle or plate iron, not less than two feet long, fitted in the throat of them, properly riveted to each flange. The thickness of the connecting plates not to be less than the thickness of the angle irons they connect.

In all cases the middle line, side, and bilge keelsons, and (where practicable) the stringers, are to be carried fore and aft, continuously through the bulkheads, the latter being made watertight around them; and where such parts of the ship are necessarily separated, the longitudinal strength is to be efficiently maintained, to the satisfaction of the Surveyors.

All middle line and intercostal keelson plates may be reduced in thickness forward and aft, to the same extent as allowed in the floor plates; or the former may be proportionately reduced in depth at the ends of the vessel.

All keelson and stringer angle irons may be reduced one-sixteenth of an inch in *thickness*, when above six-sixteenths amidships, for one-fifth the vessel's length at each end.

#### BEAMS.

Section 13. Beam plates to be in depth, one quarter of an inch for every foot in length, and to be in thickness, one-sixteenth of an inch for every inch in depth, of the said beams; to be made of H iron, T bulb iron, or bulb-plate with double angle irons riveted on upper edge, of the size given in Table G 3; or the beams may be composed of any other approved form, equal in strength.

All beams to be well and efficiently connected or riveted to the frames, with bracket ends or knee-plates; each arm of knee-plates not to be less in length than twice and a half the depth of beams, and to be in thickness equal to the beams.

The beams of the various decks are to be placed over each other.

The size of all beams which are not less in length than three-fourths of the length of the midship beam, may be in proportion to their length, as described above; all other beams must not be less than three-fourths the depth and thickness of the midship beam, excepting at hatchways exceeding in length four spaces of frames, and also mast, and pall bitt beams, and beam under the heel of bowsprit, which must not be less in size than the midship beam.

## SPACING OF BEAMS, AND STRINGERS IN HOLD.

**Section 14.** The spacing of beams, or the arrangement of stringers substituted for beams, to be regulated by the *depth of hold amidships*, measured from the upper part of floor-plates to the top of upper deck beams, in one or two-decked vessels; and to the top of middle deck beams in vessels with three decks or tiers of beams. *See also* Section 10, Paragraphs 2 and 3.

Upper deck beams in vessels with one or two tiers of beams, and the upper (or spar deck) and middle deck beams in vessels with three tiers of beams, to be fastened to alternate frames.

. Vessels under 12 feet depth of hold are to have a double angle iron stringer extending all fore and aft, about midway between bilge keelson and deck beams, riveted to reversed frames, or to single lug pieces the size of the main frames.

Vessels of 12 and under 14 feet in depth to have, in addition to the foregoing, bulb iron of the size required for their deck beams, riveted between the double angle iron stringer for three-fifths the vessel's length amidships; or the bulb iron may be dispensed with, provided that in lieu thereof, intercostal plates in long lengths be fitted between the double angle iron stringers, and attached by single angle iron to the outside plating.

Vessels of 14 and under 16 feet in depth, to have hold beams fastened to every fourth frame, and stringer plates on them, of the size prescribed in Section 16, and such vessels and those of increased depth to have a pair of double angle iron stringers of the size given in Table G 2, extending all fore and aft at the upper turn of the bilge. Stringer plates in all cases are to be supported by either beams or bracket-pieces at alternate frames. Hold beams, in this case, may be dispensed with, provided an angle iron be fitted and riveted to the inner edge of the stringer plate, of the size given for keelson angle irons in Table G 2, arranged so that its vertical flange may cover the ends of the bracket-plates; or any other plan may be adopted, if approved by the Committee.

Vessels of 16 and under 18 feet in depth, to have hold or lower deck beams fastened to every second and fourth frame, alternately, or any other arrangement may be adopted if sanctioned by the Committee.

Vessels of 18 feet in depth and above, to have hold or lower deck beams fastened to every alternate frame.

Vessels of 22 and not exceeding 24 feet in depth, from the upper part of the upper or main deck beams or more than 14 feet, and not exceeding 16 feet, from the upper part of the hold or lower deck beams to the top of the floors, to have two pairs of double angle iron stringers, extending fore and aft, between the bilge keelson and hold or lower deck beams.

All vessels having two decks (viz., upper and lower deck), and exceeding 24 feet in depth, from the top of upper deck beams to the top of floor-plates; and vessels with three decks (viz., upper, middle, and lower), exceeding 24 feet in depth from the top of middle deck beams to the top of floor-plates; and where the depth from the upper side of lower deck beams exceeds 16 feet, are to have between the hold beams and the bilge stringer, stringer plates of the same breadth and thickness as the hold beam stringer plates, fitted and attached to the outside plating and reversed frames by angle irons of the size given in Table G 2. These stringers must be supported by bracket plates riveted to them and to alternate frames, and upon the inner edge of the stringer plate, an angle iron of the size of keelson angle irons, as per Table G 2, is to be fitted and riveted so that its vertical flange may cover the ends of the bracket plates.

All sailing vessels whose frame number is more than 75, are to have a double angle iron stringer of not less size than the reversed frames, extending all fore and aft, fitted between the upper and next tier of beams, and riveted to double angle irons on each frame, and to each other; or a clamp plate equal thereto may be fitted in lieu thereof.

When the spaces between beams exceed two spaces of frames, a knee or bracket plate is to be riveted to alternate frames and to the stringer plate.

Where it is necessary, in consequence of long hatchways, engine-rooms, &c., to dispense with hold or lower deck beams to the extent of ten spaces of frames, they must be compensated for by the introduction of an angle iron of the size given for keelson angle iron as per Table G 2, riveted to the inner edge of the stringer plates, arranged so that its vertical flange may cover the ends of the bracket-plates. Where it is necessary to dispense with hold or lower deck beams in engine rooms and boiler spaces, to an extent exceeding ten spaces of frames, sufficient additional strength will be required to compensate for the deficient beams.

If an arrangement differing from the foregoing, in the spacing of the hold beams in other parts of the ship to suit convenience of cargo be required, a sketch shewing beams and stringers of extra strength, with all particulars must be submitted, through the Resident Surveyors, who are to state their opinion thereon, for the Committee's consideration.

#### PANTING (TO PREVENT).

In vessels exceeding 9 feet in depth from the lower side of the lower deck beams, extra beams, or beams and stringer plates, will be required in the peaks, forward in sailing vessels and paddle steamers, and forward and aft in screw-propelled vessels; the sizes, arrangement and security of them to be to the satisfaction of the Surveyors.

In vessels having fine ends, these stringer plates are to be fitted to the outside plating, and attached to it by angle irons.

#### PILLARS.

Section 15. All beams, for at least one-half the length of the vessel amidships, the alternate beams before and abaft this length, and all long hatchway earlings, to be pillared; and, in addition, the beams under the bowsprit, pall bitt, windlass, and capstan are to be pillared; the pillars to have not less than two rivets in each of their ends, so as to form a continuous tie from the keelson to the upper, spar, or awning deck, and to be of the sizes given in Table G 1. Where a vessel has three decks or tiers of beams, the size of the pillars to the middle tier is to be a mean between the sizes given in Table G 1.

Pillars which extend from the keelson to the upper deck beams, in vessels with two decks or tiers of

beams, or to the main or middle deck beams in vessels with three decks, to be proportionately increased in size beyond that given in Table G 1.

If pillars be fitted on a shaft tunnel, the tunnel should be strengthened to support them.

#### STRINGERS ON BEAMS.

Section 16. All vessels to have stringer plates upon the ends of each tier of beams. Those upon the ends of upper deck beams in vessels with one or two decks or tiers of beams, and on ends of main or middle deck beams, in vessels with three decks or tiers of beams or those with spar or awning decks, to be of the thickness given in Table G 2, and in width one inch for every seven feet of the vessel's length, for half her length amidships, and from thence to the ends of the vessel they may be gradually reduced to three-fourths the width amidships, as per Table G 4; in no case, however, is the width amidships to be less than eighteen inches.

The stringer plates on ends of beams below the upper deck in vessels with two decks, and on ends of beams below the main or middle deck in vessels with three decks, may be one-sixteenth of an inch less in thickness than that given in Table; their width inside the reversed frames to be not less than three-fourths the midship breadth of the upper, or middle deck stringer plates respectively; these stringers are to maintain their midship breadth for half the vessel's length amidships, and from thence to the ends of the vessel they may be gradually reduced to three-fourths their width amidships.

The stringer plates on all tiers of beams are to be fitted home and riveted to the outside plating all fore and aft, with angle iron of the dimensions required by Table G 2; the middle and lower deck stringer plates to have an additional angle iron extending all fore and aft (excepting at the main or middle deck in awning-decked vessels), riveted to the reversed frames, and to the stringer plates.

Where there would be considerable bevel to the angle iron fitted on the stringer plate and to the reversed frame aft, the angle iron may be omitted for one-twelfth of the vessel's length at that end, and flanged plates substituted for angle irons at this part for attaching the stringer plates to the outside plating.

In cases where no deck is laid, and the width of stringer plate on ends of hold beams is objected to, it may be reduced, provided such reduction be fully compensated for.

The objectionable practice of cutting through the stringer plates for the admission of wood roughtree stanchions will not be allowed.

All stringers and tie-plates when nine-sixteenths of an inch in thickness and above amidships, may be reduced one-sixteenth of an inch for one-eighth of the vessel's length before and abaft her half-length amidships; from thence to her ends they may be reduced another sixteenth of an inch in thickness. When the thickness is below nine-sixteenths of an inch amidships, it may be reduced one-sixteenth of an inch for one-fourth of her length at each end.

A lining piece should be fitted behind the upper deck stringer angle iron, from butt-strap to butt-strap of the sheerstrake, to admit of those butt-straps being in one length; the lining piece to be the thickness of the butt-straps, and increased in depth in way of scuppers to admit of being riveted to the sheerstrake above and below the upper deck stringer plate.

The upper deck stringer angle iron is in all cases to be fitted on the upper side of the stringer plate, with its deep flange vertical and turned upwards.

When gutter waterways are fitted to upper decks in vessels having poops or forecastles, the angle irons forming the ends of the gutters are to be welded; the gutters to be carefully caulked; and it is recommended that when completed they be cemented.

### TIE-PLATES ON BEAMS.

Section 17. All vessels to have tie-plates ranging all fore and aft upon each side of the hatchways, on each tier of beams, these plates to be lapped or butted, and at least double riveted. Upon hold beams where no deck is to be laid, or where tie-plates would interfere with stowage of cargo, double angle irons of the dimensions given in Table G 2 for angle irons on lower deck beam stringer plates, placed at middle line or at each side of the hatchways, extending fore and aft wherever practicable, and well riveted to all beams, deck hooks, and transoms, will be admitted in lieu thereof.

In addition to the fore and aft tie-plates, diagonal tie-plates must be fitted on the beams of the upper and main or middle deck in three-decked and spar-decked vessels, and on the upper deck in vessels having one or two decks, extending from side to side, wherever the arrangements of the deck will admit of them.

All tie-plates to be of the thickness of the stringer plates of the respective decks or tiers of beams; and in width as per Table G 3, for half the vessel's length amidships, tapered at the ends in the same proportion as the stringer plates. They are to be well riveted to each other, and to the beams, deck hooks, and transoms; and all butts to be properly shifted.

Diagonal tie-plates on beams may be dispensed with under the following conditions, viz.:—the deck stringer plates for three-fifths the length amidships must be one inch in width for every five feet of the vessel's length, after which they may be gradually reduced at the ends to three-fifths the width amidships.

### HOOKS AND CRUTCHES.

Section 18. All stringers, where practicable, to extend fore and aft, and to be efficiently connected at their ends with plates forming hooks and crutches, to the satisfaction of the Surveyors.

#### PLATING.

Section 19. The thickness of plating for half the vessel's length amidships, to be as given in Table G 1, but in sailing vessels where the number is 16,600, or above, three strakes of plating at the bilges are to be one-sixteenth of an inch thicker than therein described.

No plates to be less in length than five spaces of frames, except the fore and after hoods.

No butts of outside plating in adjoining strakes to be nearer each other than two spaces of frames, and the butts of the alternate strakes not to be under each other, but shifted not less than one frame space.

The butts of the upper or main deck, and of spar deck stringer plates, in all cases, to be shifted not less than two spaces of frames clear of the butts of the sheerstrakes.

The butts of the garboard strakes to be shifted clear of the keel scarphs, and not to be nearer each other on opposite sides of the vessel than two spaces of frames.

All butts of plating (where practicable) to be planed and fitted close, and all outside edges of plating are to be either planed or chipped fair. The butts and edges to be carefully caulked.

The thickness of the sheerstrakes amidships to be as given in Table G 1, and their breadth to be not less than 30 inches where the number for plating is under 11,800; not less than 36 inches where the number is

11,800 and under 16,600; and not less than 40 inches where the number is 16,600 or above, except where the thickness is greater than prescribed, in which case the breadth may be diminished, provided the sectional area of the sheerstrake is not less than required by the Rules.

The garboard strakes to be not less than 30 inches broad when the number for plating is under 16,600; is that number or above, the breadth is not to be less than 36 inches. Their thickness amidships to be as

given in Table G 1.

The garboard strakes of screw-propelled vessels, if ten-sixteenths of an inch or more in thickness amidships, may be reduced one-sixteenth of an inch before and abaft the half length of the vessel; if nine-sixteenths of an inch and not less than seven-sixteenths, they may be reduced one-sixteenth of an inch before the half length only.

The garboard strakes of sailing vessels or paddle steamers, if seven-sixteenths of an inch or more in thickness, may be reduced one sixteenth of an inch before and abaft the half length of the vessel.

All outside plating (excepting the garboard strakes and boss plates), where the number in Table G 1 is under 5,200, if not less than five-sixteenths in thickness amidships, and where the number exceeds 5,200, if not less than six-sixteenths in thickness amidships, may be reduced one-sixteenth of an inch for a fourth of the vessel's length at each end.

When the plates are ten and under twelve-sixteenths of an inch in thickness amidships, a reduction will be allowed of one-sixteenth of an inch for an eighth of the vessel's length before and abaft the half length amidships, and the remaining plates at the ends may be two-sixteenths of an inch less in thickness than those of their respective strakes amidships. When the plates are twelve-sixteenths of an inch or more in thickness amidships, they may be reduced three-sixteenths at the extreme ends of the vessel.

The boss-plates covering the screw shaft are to be the same thickness as the strakes amidships of which they form part.

It is recommended that, when plates forming the outside strakes of plating exceed four feet in breadth their butts should be treble riveted, or that their lengths be not less than equal to six spaces of frames.

Where gutter waterways are adopted at the upper deck, the butt-straps of the bulwark plating are to be sufficiently broad to receive the spur in the middle of the bulwark stay; and when the plates do not exceed twelve feet in length they are to have stays fitted against the butt-straps, and an intermediate stay is to be fitted between the butts. In no case are the stays which support the bulwarks to be more than six feet apart. Their size may be from 1\frac{3}{8} in. to 2 in. in diameter, regulated by the length of the stay and the size of the vessel. These arrangements may be modified according to circumstances, if to the satisfaction of the Surveyors.

#### BUTT STRAPS.

**Section 20.** In vessels where the number for plating exceeds 14,300, the butt-straps of the upper deck beam stringer plate, sheerstrake, and of three strakes of plating round the bilges, for half the vessel's length amidships, are to be one-sixteenth of an inch thicker than the plates they connect, and treble riveted; where the numbers are above 10,450, and not exceeding 14,300, the same additional strength as the foregoing will be required, excepting that only the butts of two strakes round the bilges need be treble riveted.

In smaller vessels it will only be necessary to have the butt-straps of the sheerstrake, upper deck stringer

plate, and one strake at the bilges, for half the length amidships increased one-sixteenth of an inch, and double riveted.

All butt-straps to be of the breadth given in Table G 1, and in no case to be less in thickness than the plates they connect; the fibre of the iron to be in the direction of the fibre of the plates they connect.

#### LINING PIECES.

The space between the plating and the frames to have solid filling or lining pieces in one length, closely fitted; to be of the same breadth as the frames, excepting in way of bulkheads, where they are to be fitted as stated in Section 22, Paragraph 4.

#### RIVETING AND RIVETS.

**Section 21.** In all vessels, the edges of garboard strakes and of the main or middle deck sheerstrakes and the lower edges of the upper deck sheerstrakes are to be *double* riveted. When the remaining outside plating is six-sixteenths of an inch in thickness, or less, the edges may be *single* riveted; when the plating is above that thickness the edges must be *double* riveted from the keel to the height of the upper part of bilges all fore and aft. In all vessels the edges of the plating above this height (excepting the lower edges of sheerstrakes) may be *single* riveted if the plating is eight-sixteenths of an inch or less in thickness; but if above that thickness they must be *double* riveted. The stem, sternpost, keel, butts of outside plating, breasthooks, transoms, stringer and tie plates on beams, also butts of keelsons, stringers, and all longitudinal ties, to be at least *double* riveted in all vessels.

The butts of outside plating to be chain riveted. All double and treble riveting, except in the keel, stem, and sternpost, is recommended to be chain riveting.

In chain-riveted butts, a space equal to twice the diameter of the rivet to be between each row; where treble riveting is adopted, a space equal to twice the diameter of the rivet, to be between each row, with half the number of rivets in the back row.

The overlaps of plating where chain riveting is adopted, are not to be less than six times the diameter of the rivets; and where single riveting is admitted, to be not less than three and a half times the diameter of the rivets.

The butts of side plating of partial awning-decks, poops, top-gallant forecastles, and bulwarks, may be single riveted.

The rivets are not to be nearer to the butts or edges of the plating, butt straps, or of any angle iron, than a space equal to their own diameter; and, in edge riveting, the space between any two consecutive rows of rivets must not be less than once and a half their diameter.

The rivet holes to be regularly and equally spaced and carefully punched from the faying surfaces opposite each other in the adjoining parts, laps, lining pieces, butt straps, and frames; and to be countersunk where necessary. They are to be spaced not more than four and a half diameters apart from centre to centre, excepting in the keel, stem, and sternpost, where they may be five times, and through the frames and outside plating, and in reversed angle irons on frames, where they may be from seven to nine times their diameter apart from centre to centre.

There are not to be less than four rivets in each flange of the angle irons between the frames which connect the stringer plates and intercostal plates to the outside plating,

The rivets are to be of the best quality, and to be in diameter as per Table, and to be increased in size under their heads to fill the rivet holes. When riveted up, the rivets are completely to fill the holes, their heads are to be "laid up," and their points or outer ends are not to be below the surface of the plating.

#### BULKHEADS.

Section 22. Screw propelled vessels, in addition to the engine-room bulkheads, to have a water-tight bulkhead, built at a reasonable distance from each end of the vessel.

The foremost or collision bulkhead in all cases (except in awning-decked vessels), to extend from the floorplates to the upper deck, and to be in position to the satisfaction of the Surveyor.

The engine-room bulkheads to extend from the floor plates to the upper deck, in vessels with one or two decks; and to the main or middle deck in three-decked cargo, and spar-decked vessels. The aftermost bulkhead will be required to extend to the height of the upper deck, unless it be connected to a water-tight platform or deck of iron, extending entirely round the after part of the vessel, thus rendering the lower after body a water-tight compartment; this bulkhead is to be made water-tight where the screw shaft passes through.

In sailing vessels the foremost or collision bulkhead only will be required.

All plating of bulkheads to be of the thickness prescribed in Table G 1; and when fitted between two frames at each side of the vessel, to be strongly riveted through them; or if attached only to one frame, then to have brackets or knee plates riveted horizontally against the side plating of the vessel, and to the bulkheads, foreside and aftside alternately, near the middle of the outside plates, and to be strongly riveted thereto. Lining pieces between these frames and outside plating, in way of bulkheads, are to extend in one piece from the foreside of the frame afore to the aftside of the frame abaft the bulkhead frames.

The bulkheads to be supported vertically by angle irons (of the dimensions given in Table G 1) not exceeding two feet six inches apart; and to be efficiently connected and riveted together and to the corresponding floors, beams of the several decks, and the frames. Where necessary, these bulkheads are to be further stiffened by horizontal angle irons. All such bulkheads to be caulked and made thoroughly watertight.

The upper half depth of bulkhead plating may be one sixteenth of an inch less in thickness than the lower half when the latter is six-sixteenths of an inch or above in thickness.

#### DECKS.

#### WOOD.

Section 23. The flat of decks, if of wood, to be of good quality, properly seasoned, free from sap and objectionable knots; the thickness and fastenings as per Table G 2.

In all cases the margin or boundary planks of weather decks in vessels intended for the 90 A class or above, to be either Teak or Greenheart.

If the deck is of teak, it may be one-sixth less in thickness than prescribed in Table G 2.

When the deck planks are six inches in width and under, single fastening will be sufficient; but when they are above six inches and not exceeding eight inches in width, there must be two bolts in each plank in every beam, one of which may be a short screw bolt; and planks exceeding eight inches in width must be double fastened with nut and screw bolts.

The upper deck to be fastened by screw bolts, with nuts at the under side of the angle iron of the beams,

and tie plates. The bolts must be properly sunk, with oakum and white lead under their heads, and be carefully covered over with turned dowels, bedded in white lead, marine glue, or other suitable composition. It is recommended that the screw bolts be galvanized.

Upper decks must be renewed when worn in thickness as follows, viz.:—When a deck originally 4 inches thick is worn to 3 inches;  $3\frac{1}{2}$  inches to  $2\frac{3}{4}$  inches; 3 inches to  $2\frac{1}{2}$  inches.

#### IRON.

When the decks are of iron, they may be reduced one-sixteenth of an inch in thickness from that prescribed in Table G 2, before and abaft the half length amidships, provided a beam be fitted to each frame.

When the deck plating is seven-sixteenths of an inch in thickness amidships, it may be reduced one-sixteenth of an inch before and abaft the half-length amidships.

If a wood flat be laid over an iron upper deck, it may be half-an-inch less in thickness than prescribed by Table; and in such cases, the iron deck, if five or six-sixteenths of an inch in thickness, may be reduced one-sixteenth of an inch before and abaft the half length; if seven-sixteenths in thickness amidships, it may be reduced to six-sixteenths for an eighth of the length before and abaft the half length, and the remainder to five-sixteenths of an inch.

The butts of the iron deck to be double riveted for half the length amidships.

If a wood flat be laid over an iron middle deck, it may be  $2\frac{1}{2}$  inches in thickness.

#### DOUBLE BOTTOMS.

Section 24. To entitle a vessel to be noted in the Register Book as having a "Double Bottom," the inner or second bottom must be efficiently constructed; the plating of it not to be less than five-sixteenths of an inch in thickness, where the vessel's number is under 10,450; if of that number or above, it must be six-sixteenths of an inch in thickness, and the flange or side plate in each instance must be one-sixteenth of an inch thicker. The double bottom must be efficiently connected to the outside plating and frames of the main body of the vessel. The butts and edges of the plates may be single riveted. "Man holes" must be constructed, or provision made for the removal of a portion of the plates so as to enable the inner surface of outside plating, the frames, floors, keelsons, and rivets to be thoroughly examined and coated when required.

The upper side of the plating must be protected with wood planking as ceiling, in no case to be less than  $2\frac{1}{2}$  inches in thickness.

Vessels will be marked "Part Double Bottom," provided such portions extend over at least one-half of the vessel's length.

Where double bottoms, or part double bottoms, are fitted with longitudinal girders on the floors, all the outside plating (except the garboard strakes) within the boundary of them, may be one-sixteenth of an inch less in thickness than that prescribed by the Table, provided that thickness be nine-sixteenths of an inch or more.

#### CEILING.

**Section 25.** All vessels to be closely ceiled from the main keelson to the upper part of the bilges, the ceiling to be secured in such a manner as to be easily removed; from the upper part of the bilges upwards, either batten and space or close ceiling may be adopted, but the former is considered preferable.

The ceiling on the floors is to be made in hatches where practicable, of convenient sizes, and when not so arranged, to be fastened to the reversed angle irons or frames in such a manner as to be removed when required for the purpose of survey, or for cleaning and painting.

For thickness of ceiling, see Table G 2.

#### ENGINE SPACE.

Section 26. In vessels propelled by machinery, care must be taken that the engine and boiler bearers are properly constructed, and where they may interfere with the longitudinal strength of the vessel they must extend a sufficient distance beyond the bulkheads of the engine and boiler space, to compensate for such interruption.

When the machinery and boilers are fitted, as many hold or lower-deck beams are to be introduced as may be practicable; and the vessels are to be otherwise made secure where necessary in the engine-room, to the satisfaction of the Surveyors. See Section 14, paragraph 12.

In the engine space double reversed angle irons must be fitted to every floor, extending from bilge to bilge.

#### COCKS AND VALVES.

Section 27. A sluice cock or valve is to be fitted at the limbers, at each water-tight bulkhead, to allow water to be shut off, or to reach the pumps when required; the same to be fitted, so as to be controlled at the deck next above the load water-line.

The shut-off valves or cocks of all openings for the inlet or outlet of water, in connection with the engines and boilers, are to be fitted close to the vessel's sides, and are to be accessible at all times.

All head and stern pumps to be efficiently provided with stop-cocks, to the satisfaction of the Surveyors.

#### HATCHWAYS AND MAST PARTNERS.

Section 28. All hatchways and mast-holes are to be properly framed to receive half beams where required, and the latter to have partners at the upper deck and at the tier of beams where the masts are wedged, the plating of which is not to be less in thickness than is required for stringer plates, and the united breadths of the plates are not to be less than twice the diameter of the masts. These plates are to be well riveted to each other, and to the beams, and at the decks where the masts are to be wedged; an angle iron of the dimensions required for the main frame of the ship is to be properly fitted and riveted to the plate round the mast-holes.

It is recommended to have only one large angle iron on the beams where comings are intended to be fitted of sufficient size to compensate for double angle irons, the angle iron to be on the side of the beam that will be clear of the hatchway space, and plates are to be fitted and riveted to these beams, when necessary, in order that the ends of the deck may be properly fastened.

It is recommended that all hatchway comings and companions on weather decks, but especially at the fore end of the vessel, be made of iron.

In all cases where half beams are required, fore and aft carlings, of the same size and description as the hatchway beams, are to be fitted in the hatchway spaces; the plates forming the comings and headledges are to be of sufficient strength in proportion to their size, and are to extend to the lower edge of the beams and

carlings and riveted to them, excepting that when the beams are of bulb iron they may then terminate on the bulb; where coming plates are of extra thickness, the carlings may be dispensed with.

Half beams are to be fitted to alternate frames between the hatchway beams, and their ends are to be secured by the angle irons on their upper edges being made knee-shaped, and fitted and riveted to the fore and aft carlings or comings. In addition, fore and aft tie-plates are to be fitted close to the comings and riveted to the beams and half beams. An angle iron with its flange of sufficient depth to extend half an inch above the deck is to be fitted and riveted to the comings and headledge plates, and to the beams and tie plates; its upper edge to be properly caulked, and the rivets used in its vertical flange to be countersunk and flush headed.

## SKYLIGHTS AND TRUNK BULKHEADS AROUND ENGINE HATCHES.

Section 29. The skylights to engine-rooms are in all cases to be substantially constructed, and the comings to which they are attached, to be efficiently fastened to the beams, and, whether of iron or wood, are not to be less than thirty inches above the upper deck in one, two, or three-decked vessels, and in spar-decked vessels; in awning-decked vessels, they must not be less than eighteen inches above the awning deck.

The skylights to be securely attached to the comings, and the glass in them should be very strong (from three-eighths to half an inch thick), protected by a strong guard of iron or brass rods, or by a frame work of wire; in addition, dead lights of either iron or wood must be fitted, having bull's eyes in them, and arrangements made for their efficient security in bad weather.

In steam vessels, with three decks or tiers of beams, and those having either a poop or bridge house with the engine-room beneath, the engine-room hatchways in the main deck are to be enclosed by iron trunk bulk-heads, efficiently strengthened by angle iron, and extended from the main deck to the beams above, to which they are to be secured; or, in one or two-decked vessels, to have comings at least thirty inches in height above the main deck. Strong iron doors will be allowed in these trunk bulkheads, provided their lower parts are at least eighteen inches above the main deck, and arrangements made for their efficient security.

#### COAL BUNKER PIPES AND LIDS.

Section 30. Coal bunker pipes, where practicable, are to be formed so as to be at least six inches above the upper deck, fitted with gratings and lids, the latter to have studs, to fit in openings made in the pipes, for their security, the pipes to be so formed that tarpauling may be securely lashed over them. Where it is necessary to fit flat coal bunker scuttle lids flush with the deck, they must be secured by a bar, or other approved fastening.

PORTS AND SCUPPERS.

Section 31. All vessels must be fitted with a sufficient number of ports and scuppers, to readily discharge any large quantity of water from the upper deck. The ports and flaps are to be hung by strong hinges, and the scuppers formed in the vertical flange of the upper deck stringer angle iron, which is to be increased in depth, so as to enclose the scuppers; or any other equally efficient plan may be adopted.

Where the bulwark plating and roughtree rail are cut through to form a cargo port, the bulwark stays at each end of the port should be of increased strength, to the satisfaction of the Surveyor.

A sufficient number of scuppers, with proper pipes attached to them, are to be fitted in all 'tween decks to convey water or leakage to the bilges.

#### VENTILATORS.

Section 32. It is recommended that ventilators, sufficient in number and size, be efficiently fitted to the upper deck of all vessels.

When scuttles are fitted for ventilation in the topsides of vessels, strong covers for them are to be provided; these covers to be efficiently fitted, to the approval of the Surveyor.

Where side lights are fitted in the sheerstrake within three-fifths the vessel's length amidships, compensation is to be given either by an extra thickness in the sheerstrake, doubling plate in way of the side light, or else by the introduction of strong angle iron over them.

#### CHAIN PLATES.

**Section 33.** The chain plates to be in proportion to the size of the vessel, and riveted efficiently to the outside plating (the sheerstrake being preferable).

#### BITTS.

Section 34. All bitts, when not of iron, and which do not go down to the deck below, to be fitted into iron sockets fastened through the deck to plates riveted to the beams.

#### CEMENT.

Section 35. The frames and plating of the bottom of all vessels to the upper part of the bilges to be thickly and efficiently covered with Portland or other approved cement, which may be mixed with sand or other suitable substance. Care to be taken to have a proper substance of cement at its termination, and to keep the water-courses clear all fore and aft. The whole to be to the satisfaction of the Surveyor.

#### RUDDER.

Section 36. The rudder to be made to ship and unship while the vessel is afloat. The size of main piece, given in Table G 2 to be regulated by the number which regulates the thickness of the vessel's plating; it is to be of the best hammered iron. The frame of the rudder and main piece to be one forging; the frame to be properly stayed, and carefully plated and riveted. It is recommended that the pintles be made independent of the frame.

#### WINDLASS.

**Section 37.** The windlass, for all grades, if of wood, may be composed of either of the following timbers; namely, English, African, or Live Oak; Adriatic, Italian, Spanish, Portuguese, or French Oak; East India Teak, Morung Saul, Greenheart, Morra, and Iron Bark. The iron spindle in all cases to pass through the body of the windlass.

#### PUMPS.

Section 38. One pump at least, of sufficient size and of approved construction, to be fitted in each compartment, or an arrangement made so as to have a sufficient number, independent of the engine pumps.

### EQUIPMENT.

Section 39. The equipment is to be regulated by the number produced by the sum of the measurements of the half moulded breadth of the vessel amidships, her depth from the upper part of keel to

the top of the upper deck beams, and the girth of her half midship section to the same height, multiplied by her length, for a one, two, or three-decked vessel, and for a spar-decked vessel.

For a vessel with an awning deck, the equipment number to be increased one-sixth beyond that which it would be if she were flush-decked, and without an awning deck.

For a vessel with a partial awning deck, poop, top-gallant forecastle, or a raised quarter deck, the equipment number to be increased one-tenth beyond that which it would be if she were flush-decked.

See Table 22 and footnotes thereto.

In Ships navigated by steam, the boilers and machinery are to be considered as part of the equipment, and, unless the Surveyors are satisfied of their efficiency, the figure 1 will be withheld.

#### REPORTS ON VESSELS.

Section 40. The Surveyors, in submitting their Reports of vessels not already classed, are in all cases, where practicable, to forward a Sketch of the Midship Section, and other drawings where necessary, to be furnished by the Builders, with figured dimensions of the component parts marked thereon.

Builders wishing to adopt plans other than those described herein, are to submit them through the Resident Surveyors (who are to state their opinions thereon), for the Committee's consideration and approval.

#### THREE-DECKED VESSELS.

Section 41. Vessels having three decks or tiers of beams, or stringers in lieu thereof, where the space between the upper and middle decks is intended for the stowage of general cargo, will be noted in the Register Book thus—"Three decks."

The scantlings of the frames, reversed frames and floor-plates, the thickness of bulkheads, and diameter of pillars, are determined by the number produced by the deduction of seven feet from the sum of the measurements in feet, arising from the addition of the half-moulded breadth of the vessel amidships, the depth from the upper part of the keel to the top of the upper deck beams, and the girth of the half midship frame section measured from the centre line at top of keel to the upper deck stringer plate.

The scantlings of the keel, stem, sternpost; the thickness of the outside plating, keelson and stringer plates, and deek; also the scantlings of the angle irons on beam stringer plates, and keelson and stringer angle irons in hold, as in Tables G 1 and G 2, are governed by the number obtained by multiplying that which regulates the size of the frames, &c., by the length of the vessel.

All the frames are to extend to the upper deck stringer plate.

The reversed frames are to extend to the upper part of the main or middle deck stringer angle iron, and to the upper part of the frames alternately.

The main or middle deck sheerstrake must be of the thickness prescribed in Table G 1, and amidships its lower edge must not be more than one-half its depth below the main deck stringer plate; it may be reduced in thickness if fully compensated for by increasing the thickness of the plating above it.

The main deck stringer plate to be of the thickness prescribed in Table G 2; it is to be fitted and connected to the sheerstrake by angle irons between the frames of the size given for beam stringer angle iron, and in addition, an inner stringer angle iron of the same size, passing continuously fore and aft, must be riveted to reversed angle iron on each frame, and to the stringer plate—the space between this angle iron and

the sheerstrake, all fore and aft, to be filled in and made watertight. Similar angle irons are to be riveted to the stringer plate, reversed frames, and outside plating, at the lower deck.

Where there would be considerable bevel to the angle iron fitted on the stringer plate, and to the reversed frame aft, the angle iron may be omitted for one-twelfth of the vessel's length at that end, and flanged plates may be substituted at that part for angle irons for attaching the stringer plates to the outside plating.

In such vessels, where the number for plating is below 14,300, the plating from the main to the upper deck sheerstrake must not be less than six-sixteenths of an inch in thickness; if 14,300 and under 16,600, it must not be less than seven-sixteenths; if 16,600 and under 26,400, it must not be less than eight-sixteenths; and if 26,400, or above, it must not be less than nine-sixteenths of an inch in thickness.

A reduction of two-sixteenths of an inch from the thickness required by Tables G 1 and G 2 for the main deck sheerstrakes, stringers, and tie plates, will be allowed for those of the upper deck; but their widths must not be less than those of the main deck. The main deck stringer and tie plates may be reduced in thickness, if those of the upper deck be proportionately increased.

The upper deck beams to be in size as per Table G 3; excepting those at hatchways exceeding in length eight spaces of frames, where they must be equal in size to those of the main deck.

Fore and aft and diagonal tie plates must be fitted on the main and upper deck beams, or compensated for. See Section 17, last Paragraph.

The butt straps of the upper and middle deck sheerstrakes and stringer plates, and of three strakes of plating at the bilge, to be one-sixteenth of an inch thicker than the plates they connect, and treble riveted, for half the vessel's length amidships.

In these vessels, a side intercostal keelson is to be fitted and attached to the outside plating by angle irons of not less size than  $3 \times 3 \times \frac{7}{16}$ ; but if the plating number is 21,700 or above, then these angle irons must not be less than  $3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$ . When a double bottom is fitted, this keelson may be dispensed with in the range thereof.

The thickness of the flat of upper deck is to be as given in Table G 2. In all cases a main or middle deck is to be properly laid and caulked, the thickness of which may be one-half inch less than that prescribed for the upper deck.

If in such vessels the length exceeds eleven times the depth taken from the upper part of the keel to the top of the main deck beams, additional strength will be required at the bilge and bottom, as per Section 46; but no additional strength at the sheerstrake and stringer plate will be needed until the length exceeds eleven times the depth taken from the upper part of the keel to the top of the upper deck beams; when this is the case, additional strength will be required in the upper deck sheerstrakes and stringer plates, as per Section 46, relating to vessels' proportions.

#### SPAR-DECKED STEAM VESSELS.

Section 42. Vessels noted in the Register Book as "Spar decked," are those which are of light construction above the main or middle deck.

In such vessels the scantlings and arrangements are to be regulated by the dimensions under the main or middle deck, as in those having one or two decks.

All the frames must extend to the spar-deck stringer plate, or to the lower part of the curve when of a rounded form at the gunwale.

The reversed angle irons on the frames are to extend to the upper part of the hold or lower deck beam stringer angle iron, and to the upper part of the main deck stringer angle iron alternately.

When the plating number is under 14,300, the plating from the main to the spar-deck sheerstrake must not be less than six-sixteenths of an inch in thickness; if 14,300 and under 26,400, it must not be less than seven-sixteenths of an inch in thickness; and if 26,400 or above, it must not be less than eight-sixteenths of an inch in thickness.

A reduction of two-sixteenths of an inch from the thickness required by Tables G 1 and G 2, for the main deck sheerstrakes, stringer and tie-plates, will be allowed for those of the spar-deck; but their widths must not be less than those of the main deck.

The spar-deck beams to be in size as per Table G 3, excepting those in hatchways exceeding in length eight spaces of frames, where they must be equal in size to those of the main deck.

Fore and aft and diagonal ties must be fitted on the main and spar-deck beams, or compensated for. See Section 17, last Paragraph.

The butt straps of the spar and main deck sheerstrakes and stringer plates, and of three strakes of plating at the bilge, to be one-sixteenth of an inch thicker than the plates they connect, and treble riveted for half the vessel's length amidships.

In these vessels, a side intercostal keelson is to be fitted and attached to the outside plating by angle irons of not less than  $3 \times 3 \times \frac{7}{16}$ ; but if the plating number is 21,700 or above, then these angle irons must not be less than  $3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$ . When a double bottom is fitted, this keelson may be dispensed with in the range thereof.

The lower edge of the main sheerstrake must not be more than one-half its depth below the main deck stringer plate.

When the spar-deck is constructed of a rounded form at the gunwale, the beams may be of plain angle iron, if of not less strength than prescribed above, and are to scarph the main frames with not less than two feet lengths, and to be properly riveted to them. The rounded gunwale plates are to be of the same thickness as the spar-deck stringer plates, and properly constructed, to the satisfaction of the Surveyors.

The main deck stringer plate is to be fitted and connected to the sheerstrake by angle irons between the frames, of the size given for beam stringer angle iron, and in addition, an inner stringer angle iron of the same size, passing continuously fore and aft, must be riveted to reversed angle iron on each frame, and to the stringer plate; the space between this angle iron and the sheerstrake, all fore and aft, to be filled in and made watertight. Similar angle irons are to be riveted to the stringer plate, reversed frames, and outside plating at the lower deck.

Where there would be considerable bevel to the angle iron fitted on the stringer plate, and to the reversed frame aft, the angle iron may be omitted for one-twelfth of the vessel's length at that end, and flanged plates may be substituted at that part for angle iron for attaching the stringer plate to the outside plating.

These vessels are to have a complete main or middle deck  $3\frac{1}{2}$  inches in thickness, properly laid and caulked; and a main or middle deck sheerstrake of the thickness prescribed by Table G 1.

The flat of spar-deck to be not less than 3 inches in thickness.

Such erections only as are necessary for navigating these vessels will be allowed on the spar-deck.

The measurement of depth, for regulating the additional strength required for vessels of extreme propor-

tions given in Section 46, is to be taken from the upper part of keel to the top of the main or middle deck beams.

When Section 46 (relating to vessels' proportions) applies to these vessels, the increased strength defined for sheerstrakes and stringer plates is to be added to those of the main or middle deck.

Vessels to which this rule applies, as regards an entire spar-deck, will be noted in the Register Book thus:—"Spar decked."

#### AWNING-DECKED VESSELS.

Section 43. In awning-decked vessels all the frames must extend to the awning-deck stringer plate, or to the lower part of the curve when of a rounded form at the gunwale, for one-sixth of the vessel's length at each end; in the remaining space, if every alternate frame be extended to the above height it will be sufficient if additionally strengthened in way of the rigging.

The size of the frames must never be less than  $3 \times 3 \times \frac{6}{16}$ .

The height to which the reversed frames are to be carried to be regulated by the numbers, as in one or two-decked vessels.

All the side plating above the main sheerstrake in vessels whose number is under 14,300 to be not less than five-sixteenths of an inch in thickness; if of that number or above, to be not less than six-sixteenths in thickness. Also a reduction of one-fourth from the dimensions of the main deck stringer and tie-plates, angle iron on stringer plates, and flat of deck, will be allowed for those of the awning-deck.

The beams may be of plain angle iron of the size required in Table G 2 for gunwale angle irons, provided that the breast, mast, and hatchway beams have an angle iron of the size of the reversed frames riveted to them. They are to be placed at every alternate frame, to scarph the main frames not less than eighteen inches, and to be properly riveted to them.

Diagonal tie-plates need not be fitted on the awning-deck beams.

Rounded gunwale plating may be of the thickness required for the awning-deck stringer plate. The gunwale must be properly constructed to the satisfaction of the Surveyors.

In these awning-decked vessels there must be scuppers and ports at the main deck through the side, to discharge water; and comings and hatches as fitted to a weather deck. See Sections 29 and 31.

## POOPS, TOP-GALLANT FORECASTLES, &c.

Section 44. In full poops, top-gallant forecastles, and engine space enclosures, a reduction of one-fourth from the dimensions which would be required in the same range if the vessel were flush decked, will be allowed in the outside plating, beams, stringer and tie-plates upon beams, angle iron on stringer plates, and flat of deck. In no case need the side plating exceed six-sixteenths of an inch in thickness, and it must not be less than four-sixteenths.

All frames to extend to the poop or forecastle stringer plate, or to the lower part of the curve when of a rounded form at the gunwale. The beams may be of plain angle iron, not less in dimensions than the size required in Table G 2 for keelson angle irons, provided that the breast, mast, and hatchway beams, have an angle iron of the size of the reversed frames riveted to them. A beam to be placed at every alternate frame to searph the main frames not less than eighteen inches, and to be properly riveted to them.

The rounded gunwale plating may be of the thickness required for the poop or forecastle stringer plates. The gunwale must be properly constructed to the satisfaction of the Surveyors.

If the poop does not extend beyond one-fourth the vessel's length from aft, tie-plates need not be fitted on their beams.

Where the poop exceeds one-fourth of the vessel's length, the upper deck stringer plate and sheerstrake are to be either increased in thickness or doubled, in way of the break, for a length of from twenty to thirty feet, or increased strength at this part may be obtained in any other way, if to the satisfaction of the Surveyor

## RAISED QUARTER-DECKS.

Section 45. In raised quarter-decks, a reduction of one-fifth from the thickness which would be required in the same range if the vessel were flush decked, will be allowed in the stringer and tie-plates upon beams, and angle iron on stringer plates.

Side plating of raised quarter-decks may be one-sixteenth of an inch less in thickness than topside plating below it, if six-sixteenths of an inch in thickness or more.

The flat of deck must not be less than three inches in thickness.

The frames in all cases, and the reversed angle irons on alternate frames, are to extend to the raised quarter-deck stringer plate.

The upper deck beam stringer plate is to maintain its breadth to the break of the quarter-deck, and then it may be gradually reduced in breadth until it terminates at the third frame abaft the break, and it is to be fitted and riveted to the outside plating. The upper deck sheerstrake is to extend to the stern. The front or break bulkhead of the raised quarter-deck is to be stiffened by a thwartship plate, of not less size than the upper deck beam tie-plates, and efficiently connected to it by angle iron; this thwartship plate is to be supported by bracket plates, when not riveted to a beam.

Fore and aft and diagonal tie-plates must be fitted on the beams of the raised quarter-deck, or compensated for.

Where the raised deck exceeds one quarter of the vessel's length, the main sheerstrake should be doubled, or increased in thickness, for a reasonable distance before and abaft the break; the side plating of the raised deck should be increased in thickness at the break, and be extended for some distance before the break; the butts of this plating, the main sheerstrake, and the strake of plating next below must be treble riveted in the neighbourhood of the break, and the butt straps be one-sixteenth of an inch thicker than the plates they connect. The main deck stringer plate should extend abaft the break about seven frame spaces, and the raised deck stringer plate about four frame spaces before the break, and the stringer plates below the main deck should have a shift of about sixteen feet overlap, or the necessary strength may be obtained by other arrangements if approved by the Surveyors.

## VESSELS OF EXTREME PROPORTIONS.

Section 46. In the following cases additional longitudinal strength, beyond that stated in Tables G, will be required, viz.:—

The length, breadth and depth to be taken as per Sect. 1.

## VESSELS ABOVE 11 AND NOT EXCEEDING 12 DEPTHS IN LENGTH.

The main sheerstrake to be increased in thickness one-sixteenth of an inch, for three-fourths the vessel's length amidships.

To have a bulb plate of the dimensions required for the midship beam plate, placed between, and riveted to, the double angle iron bilge keelson for half the vessel's length amidships.

Such vessels, where the number for plating is under 18,700, to have one strake of plating at the bilge one-sixteenth of an inch thicker than prescribed in Table G 1, for half the vessel's length amidships; but where the number is 18,700, or above, two strakes are to be one-sixteenth of an inch thicker for one-half the length.

## VESSELS ABOVE 12 AND NOT EXCEEDING 13 DEPTHS IN LENGTH.

The main sheerstrake to be increased in thickness two-sixteenths of an inch for three-fourths the vessel's length amidships.

The upper deck stringer plate to be increased in thickness one-sixteenth of an inch for three-fifths the vessel's length amidships, or to be proportionately increased in width for the same distance (which is preferable), gradually tapered to the width at ends as per Section 16.

To have a bulb plate of the dimensions required for the midship beam plate placed between and riveted to the double angle iron bilge keelson for three-fifths the vessel's length amidships.

Such vessels, where the number for plating is under 18,700, to have two strakes of plating at the bilge one-sixteenth of an inch thicker than prescribed in Table G 1, for one-half the vessel's length amidships; but where the number is 18,700 or above, three strakes are to be one-sixteenth of an inch thicker for one-half the length.

## VESSELS ABOVE 13 AND NOT EXCEEDING 14 DEPTHS IN LENGTH.

The main sheerstrake to be increased in thickness two-sixteenths of an inch for three-fourths, and the upper strake of topside plating one-sixteenth of an inch for one-half, the vessel's length amidships.

The upper deck stringer plate to be increased in thickness two-sixteenths of an inch for three-fifths the vessel's length amidships, or to be proportionately increased in width for the same distance (which is preferable), gradually tapered to the width at ends, as per Section 16.

To have a bulb plate, of the dimensions required for the midship beam plate placed between and riveted to the double angle iron bilge keelson for three-fifths the vessel's length amidships.

To have an intercostal keelson fitted between the middle line and bilge keelsons as far forward and aft as practicable; where the number for plating is 14,300 or above, the intercostal keelson is to be attached to the outside plating, as per Section 11, Paragraphs 2 and 3\*.

Such vessels, where the number for plating is under 18,700, to have three strakes of plating at the bilge one-sixteenth of an inch thicker than prescribed in Table for one-half the vessel's length amidships; but where the number is 18,700, or above, to have two strakes one-sixteenth of an inch thicker for three-fifths the vessel's length amidships, and one strake two-sixteenths of an inch thicker for half the length; from thence they may be gradually tapered to the thickness of the strakes below them at the extreme ends.

<sup>\*</sup> In cases where a double bottom is fitted with longitudinal girders, these keelsons need not be fitted within it.

## VESSELS ABOVE 14 AND NOT EXCEEDING 15 DEPTHS IN LENGTH.

The main sheerstrake to be doubled its depth, from the topside strake upwards, for three-fourths the vessel's length amidships, the doubling to be of not less thickness than the strake next below the sheerstrake, and to be properly butt strapped.

The upper deck stringer plate to be increased in thickness two-sixteenths of an inch for three-fifths the

vessel's length amidships.

To have a bulb plate, of the dimensions required for the midship beam plate, placed between and riveted to the double angle iron bilge keelson for three-fifths the vessel's length amidships.

To have an intercostal keelson fitted between the middle line and bilge keelsons as far forward and aft as practicable; where the number for plating is 14,300 or above, the intercostal keelson is to be attached to the outside plating, as per Section 11, Paragraphs 2 and 3.\*

Such vessels, where the number for plating is under 18,700, to have one strake of plating at the bilget doubled for three-fifths the vessel's length amidships, extending from edge to edge of the adjoining strakes; but where the number is 18,700 or above, one strake of bilge plating is to be doubled for three-fifths, and one strake increased two-sixteenths of an inch in thickness, for one-half the vessel's length amidships respectively.

## VESSELS ABOVE 15 AND NOT EXCEEDING 16 DEPTHS IN LENGTHS.

The main sheerstrake to be doubled its depth from the topside strake upwards for three-fourths the vessel's length amidships; the doubling to be of not less thickness than the strake next below the sheerstrake, and to be properly butt strapped.

The upper deck stringer plate to be increased in thick two-sixteenths of an inch for three-fifths the vessel's

length amidships.

To have a bulb plate of the dimensions required for the midship beam plate placed between and riveted to the double angle iron bilge keelson for three-fourths the vessel's length amidships.

To have an intercostal plate fitted between and riveted to the double angle iron stringer at the upper turn of the bilge, and to the outside plating by angle irons, of the size of the reversed frames, for three-fifths the vessel's length amidships.

To have an intercostal keelson fitted between the middle line and bilge keelsons, as far forward and aft as practicable. Where the number for plating is 14,300 or above, the intercostal keelson is to be attached to the outside plating, as per Section 11, Paragraphs 2 and 3.\*

- \* In cases where a double bottom is fitted with longitudinal girders, these keelsons need not be fitted within it.
- † When plates have to be doubled, the butts of these plates and of the doubling plates are to have butt straps double riveted, and, in addition, these doubling plates are to be well riveted to and between the frames; all butts of inside strakes to be riveted complete, independent of the outside strakes.

In no case is the treble riveting of the butts at the bilges to be dispensed with, excepting in the case of the strake or strakes, which are doubled.

‡ The plating need not be increased in thickness nor doubled at the bilge, provided an intercostal plate be fitted between and riveted to the angle iron stringer at the upper turn of bilge, and to the outside plating, by longitudinal angle irons of the size of the reversed frames, for three-fifths the vessel's length amidships.

Such vessels, where the number for plating is under 18,700, to have two strakes of the plating at the bilge one-sixteenth of an inch thicker for three-fifths the vessel's length amidships, and one strake two sixteenths of an inch thicker for half the length; but where the number is 18,700 or above, one strake of plating at the bilge to be doubled, for half the vessel's length amidships.\*

"Spar-decked steam vessels" are to have extra strength at their bilges, in the proportion of their length to depth, as described above; they may, however, be 12 and under 13 depths in length before they are required to have the remaining extra strength prescribed for one or two-decked vessels of 11 to 12 depths in length; and such vessels exceeding the above proportions to have extra strength in the same relation to that prescribed for one and two-decked vessels.

#### VESSELS EXCEEDING 16 DEPTHS IN LENGTH.

In cases of vessels which exceed sixteen depths in length, the Builders are to submit to the Committee, through the resident Surveyors, their plans for giving the vessel sufficient additional strength longitudinally. The depth for the foregoing purpose in three-decked vessels, is to be taken as per Section 41.

### VESSELS ABOVE 8 BREADTHS IN LENGTH.

Vessels exceeding eight times but under nine times their breadth in length are to have their stringer plates on the *upper* deck beams, in one or two-decked vessels, and on the *main* or middle deck, in spar-decked vessels and three-decked vessels, one inch in breadth for every six feet of length, and the fore and aft and diagonal tie-plates in the usual manner; or the diagonal tie-plates may be dispensed with if the stringer plates be made one inch in breadth for every four and a half feet of length. In the former case the stringer plates are to maintain their breadth for half the vessel's length amidships, gradually tapering to three-fourths the width amidships at ends; in the latter case they are to maintain their breadth for three-fifths the vessel's length amidships, gradually tapering to three-fifths their midship breadth at the ends.

### VESSELS ABOVE 9 BREADTHS IN LENGTH.

Vessels above nine and not exceeding ten breadths in length, are to have their stringer plates on the *upper* deck beams in one or two-decked vessels, and on the *main* or middle deck in spar-decked vessels and three-decked vessels, one inch in width for every five feet in length with diagonal tie-plates, or one inch for every four feet of length without them; the stringer plates are to maintain their breadth for the same length amidships, and tapered at ends in the same proportion as in the preceding case.

An intercostal plate is also to be fitted between and riveted to the double angle iron stringers at the upper turn of bilge for one-half the vessel's length amidships, these plates to be connected by angle iron to the outside plating.

#### VESSELS ABOVE 10 BREADTHS IN LENGTH.

When vessels are above ten breadths in length, the stringer plates on the main and upper deck are to be not less than one inch in width for every seven feet of the vessel's length for three-fifths her length amidships,

<sup>\*</sup> The plating need not be increased in thickness, nor doubled at the bilge, provided an intercostal plate be fitted between and riveted to the double angle iron bilge keelson, and to the outside plating by longitudinal angle iron of the size of the reversed frames, for one-half the vessel's length amidships.

after which they may be gradually reduced to three-fourths the width amidships at the ends; and in addition, the remaining portion of the upper deck space of one or two-decked vessels, and of the main or middle deck space in spar-decked vessels or three-decked vessels, to be covered with iron plate, the thickness of which is to be as per Table G 2. See Section 23.

Fore and aft diagonal tie-plates must be fitted on the upper deck in three-decked or spar-decked vessels, or compensated for.

Intercostal plates are to be fitted between and riveted to the double angle iron stringers at the upper and lower turn of bilge for three-fifths and one half the vessel's length amidships respectively, these plates to be connected by angle iron to the outside plating.

#### VESSELS NOT BUILT UNDER SURVEY.

Section 47. In cases of vessels not surveyed while building, for which a character may be required, application must be made to the Committee in writing, who will direct a special examination to be made by two Surveyors of the Society (one of whom shall be an exclusive officer), for which purpose the vessel is to be placed on high blocks in a dry dock or on ways; the hold to be cleared and proper stages made; the rivets and plating of keel, and flat of bottom, throughly examined; the close ceiling in the hold to be removed where deemed necessary, and coal bunkers of steam vessels to be cleared; the whole of the frames, stringers, hooks, floor-plates, keelsons, engine and boiler bearers, ends of beams, watertight bulkheads, rivets, and inner surface of the plating exposed to view;\* all oxidation to be removed by being cut or beaten off the several parts above named, also from the outside plating, rivets, keel, stem, sternpost, and rudder; and the planksheers and waterways, if of wood, to be scraped bright. When the vessel is so prepared, the Surveyors are to ascertain by drilling the thickness of the plating in such parts as they may deem necessary, also the condition of all the parts of iron above named, and of the planksheers, waterways, flat of decks and their fastenings; and send a detailed report thereon, stating the dimensions and quality of the materials and workmanship, to the Committee, who will then assign the vessel such character as the facts may appear to them to warrant.

Vessels not built under survey, but classed 90  $\bigwedge$ , or under, must be subjected, in addition to occasional or annual surveys, when practicable, to a special survey every three years, as per Nos. 1, 2, and 3; and afterwards those which may be classed less than 90  $\bigwedge$ , according to Nos. 1 and 3 alternately; but if classed 90  $\bigwedge$  and found in satisfactory condition when Survey No. 3 has been held, such vessels may be subjected to Surveys Nos. 1 & 3 alternately, at intervals of four years. See page 48.

Vessels which have undergone the above examination will be noted in the Register Book thus, s.s. No.1-70, s.s.No.2-70, s.s.No.3-70; and if not submitted to such survey, will be liable to have their character suspended.

<sup>\*</sup> In cases where the inner surface of the bottom plating is coated with cement or asphalte, if the coating be carefully inspected, and tested by beating or chipping, and found sound and adhering satisfactorily to the iron, its removal may be dispensed with, provided that upon the removal of a portion, the plating, frames, and rivets under it be found in satisfactory condition.

# EXTRACTS FROM RULES APPLICABLE TO VESSELS CLASSED UNDER REGULATIONS PREVIOUSLY PASSED FOR THE BUILDING AND CLASSIFICATION OF IRON SHIPS.

All vessels will be classed A so long as on careful annual and periodical *special* surveys they are found to be in a fit and efficient condition to carry dry and perishable cargoes to and from all parts of the world.

Differences of construction, as regards thickness of plating, strength, and probable durability, &c., will be indicated by the letters A B and c placed inside the letter A,—thus, A A.

A will denote that the vessels have been built in accordance with, or equal to, the Rules and Table G.

A will denote vessels which are considered entitled to the A character, but which have not been built in accordance with the Rules.

All vessels to be subject to occasional or annual survey when practicable.

To entitle Ships to retain their respective characters in the Register Book, the following Special Surveys must be held periodically:—

Survey No. 1.—The vessel to be placed on blocks of sufficient height in a dry dock, or on ways; the limber boards, and ceiling equal to one strake fore and aft on each side removed, with both surfaces of outside plating exposed.\*

**Survey No. 2.**—The vessel to be placed on blocks of sufficient height in a dry dock, or on ways; the limber boards, and ceiling equal to *three* strakes fore and aft on each side removed, with both surfaces of outside plating exposed.\*

The windlass at this and all subsequent alternate surveys to be unhung, and its wood linings stripped, for the examination of the main piece and its general efficiency. The chain cables are also to be ranged on deck for inspection.

Survey No. 3 by two Surveyors, one to be an Exclusive Officer of the Society.—The vessel to be placed on blocks of sufficient height, in a dry dock, or upon ways; proper stages to be made and the hold to be cleared; all the close ceiling in the hold to be removed, so that the rivets and plates of keel, and flat of bottom may be thoroughly examined; coal bunkers of steam vessels to be cleared, the whole of the frames, stringers, hooks, floor-plates, keelsons, engine and boiler bearers,† ends of beams, water-tight bulkheads, rivets, and inner surface of the plating to be exposed;\* all oxidation to be removed by being cut or beaten off the several parts above-named, also from the outside plating, rivets, keel, stem, sternpost, and rudder, so as to completely lay bare all the surfaces of iron; the planksheers and waterways, if of wood, to be scraped bright. When the vessel is so prepared, the Surveyors are to ascertain the thickness of the plating by drilling in such parts as they may deem necessary.

<sup>\*</sup> In cases where the inner surface of the bottom plating is coated with cement or asphalte, if a sufficient quantity of ceiling be removed to enable the coating to be carefully inspected and tested by beating or chipping, and the coating be found sound and good and adhering satisfactorily to the iron, the removal of such coating will be dispensed with. Ships which have undergone the above examination will be noted in the Register Book thus, s.s.No.1-68, s.s.No.2-68, s.s.No.3-68; and if not submitted to such Survey, will be liable to have their character suspended.

<sup>†</sup> Whenever the engines and boilers are taken out for repair, the engine and boiler bearers, with the floor-plates, keelsons, rivets, &c., under them may, at the request of the owners, be surveyed in anticipation of the above Rule.

Such parts as may be found defective, or less than three-fourths of the required substance by Rule, are to be removed and replaced with proper materials, equal in substance and quality to the original construction. The planksheers, waterways, flat of decks and their fastenings, are also to be examined and made good where necessary.

Whenever the bottom plating is to be cemented, a survey is to be held prior to the cement being laid.

Every ship classed  $\bigwedge$  or  $\bigwedge$  must be submitted to a *special periodical survey* every *four* years:—the first survey according to No. 1; the second according to No. 2; the third according to No, 3; and afterwards according to No. 1 and No. 3 *alternately* at intervals of four years.

Every ship classed  $\wedge$  must be submitted to a special periodical survey every three years, as per No. 1, 2, and 3, afterwards No. 1 and 3.

## RULES FOR THE SURVEY OF IRON SHIPS CLASSED FOR PERIODS OF YEARS.

All vessels thus classed to be subject to occasional or annual survey when practicable, and every third year to be specially surveyed in dry dock or laid on blocks, with both surfaces of outside plating exposed;\* and whenever the engines or the boilers of iron steam ships are taken out, the vessel shall be submitted to a particular and special survey.

#### CONTINUATION OF IRON SHIPS TO THE CHARACTER A.

Section 20. If, on the termination of the period of original designation, or if at any subsequent period, not exceeding one-half the number of years assigned originally, or on Restoration, an Owner shall wish to have his ship remain or be replaced on the letter A, he is to send a written notice thereof to the Secretary, and the Committee shall then direct a special survey, as follows, to be held by not less than two competent persons, to be appointed by the Committee, one of them to be a Surveyor the exclusive servant of the Society.

#### SURVEY.

The vessel to be placed on high blocks, in a dry dock, or upon ways, and proper stages to be made, so that the rivets and plates of keel, and flat of bottom, may be thoroughly examined; the whole of the ceiling or lining inside to be entirely removed; coal bunkers of steam vessels to be cleared, so as to expose the whole of the frames, stringers, hooks, floor-plates, keelsons, engine and boiler bearers, ends of beams, watertight bulkheads, rivets, and inner surface of the plating, to view; the hold to be cleared; all oxidation to be removed by being cut or beaten off the several parts above named, also from the outside plating, rivets, keel, stem, sternpost, and rudder, so as to completely lay bare all the surfaces of iron;\* the planksheers and waterways, if of wood, to be scraped bright; and when the vessel is so prepared, the Surveyors are to ascertain, by drilling, the thickness of the plating, also the condition of all the parts of iron above-named, and of the planksheers, waterways, flat of decks and their fastenings; and upon the Owner consenting to remove and replace with proper

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<sup>\*</sup> In cases where the inner surface of the bottom plating is coated with cement or asphalte, if a sufficient quantity of ceiling be removed to enable the coating to be carefully inspected, and tested by beating or chipping, and the coating be found sound and good and adhering satisfactorily to the iron, the removal of such coating will be dispensed with. Ships which have undergone the above examination will be noted in the Register Book, thus, t.s.; and if not submitted to such triennial Survey, will be liable to have their character suspended.

materials, equal in substance and quality to the original construction, such parts as may be found defective, or less than three-fourths of the required substance by Rule, such vessel, upon the repairs and efficiency being reported to the Committee, may be Continued on the letter A for a term of years not exceeding one-half the number of years assigned originally, or on Restoration, subject to occasional or annual survey when practicable. The period of Continuation will, upon all occasions, commence from the time the ship may have gone off the letter A, without regard to the date when the survey for this purpose may be held.

### RESTORATION OF IRON SHIPS TO THE CHARACTER A.

**Section 21.** If, at any age of a vessel, an Owner be desirous to have his ship Restored, such Restoration, on his application to the Committee, and consenting to the special survey hereinafter described, to be held by two Surveyors, one of whom shall be an exclusive servant of the Society, and performing the repairs thereby found requisite, will be granted for a period not exceeding two-thirds of the time originally assigned, the same to be calculated from the date of such repairs.

## SURVEY AND REQUISITES FOR RESTORATION.

The vessel to be placed on high blocks, in a dry dock, or upon ways, and proper stages to be made, so that the rivets and plates of keel, and flat of bottom, may be thoroughly examined; the whole of the ceiling or lining inside to be entirely removed; coal bunkers of steam-vessels to be cleared, the boilers to be taken out and also the engines (unless it shall be shown by previous survey that the removal is unnecessary), so as to expose the whole of the frames, stringers, hooks, floor-plates, keelsons, engine and boiler bearers, ends of beams, watertight bulkheads, rivets, and inner surface of the plating, to view; the hold to be cleared; all oxidation to be removed by being cut or beaten off the several parts above-named, also from the outside plating, rivets, keel, stem, sternpost, and rudder, so as to completely lay bare all the surfaces of iron; \* the planksheers and waterways, if of wood, to be entirely removed, and also the flat of upper deck, except under special circumstances, to be sanctioned by the Committee in each case: and when the vessel is so prepared, the Surveyors are to ascertain, by drilling, the thickness of the plating, also the condition of all the parts of iron above-named, and of the beams and their fastenings; and upon the Owner consenting to remove such parts as may be found defective, or objected to, or less in thickness than hereinafter admitted for repairing such vessel, and replace them with proper materials equal in quality and substance to that required in the Table G for the nine years' grade in those originally classed 12 A, and equal in quality and substance to that required in the Table G for the six years' grade in vessels originally classed 9 A or 6 A, such vessel, upon the repairs and efficiency being reported to the Committee, may be restored to the letter A, for a term of years not exceeding two-thirds the number of years assigned originally, subject to occasional survey.

Iron ships which have been Restored under the foregoing Rule shall be entitled to Continuation thereon, subject to the same conditions of survey and examination as are prescribed for ships proposed to be Continued at the expiration of the period first assigned to them; but, in like manner, the term of such extended

<sup>\*</sup> In cases where the inner surface of the bottom plating is coated with cement or asphalte, if a sufficient quantity of ceiling be removed to enable the coating to be carefully inspected, and tested by beating or chipping, and the coating be found sound and good and adhering satisfactorily to the iron, the removal of such coating will be dispensed with.

continuance to be limited to a period not exceeding one-half the number of years for which the ship may respectively have been restored, without reference to the period originally assigned to them.

- **Section 22.** Vessels not surveyed while building will be classed A from year to year only, but for a period not exceeding six years. (See also Section 19.)
- **Section 23.** On the expiration of the terms assigned to ships classed A, they will be liable to lapse (like ships built of wood).
- Section 24. One year will be added to the Character of all ships of the A class built under a roof which shall project at each end beyond the length, and on each side beyond the breadth, a quantity equal to one-half the breadth of the vessel.

#### IRON SHIPS ALREADY CLASSED A 1.

Iron ships built prior to the promulgation of the Rules will be allowed to remain in the Register Book classed A 1 from year to year, subject to annual survey, until the expiration of Six Years from their date of build, and then be examined to determine the period to which they may be entitled under the Rules; and if, on such examination, it shall be found the ships are entitled to the 9 or 12 years' grade, it will be in the option of the Owners either to adopt such period respectively, or continue the vessel A 1 from year to year, as above, until the expiration of the extended period; but if it shall be found that the term of years for which a vessel would have been entitled to remain on the A character has expired, she will be classed Æ, if entitled thereto, unless specially surveyed for Continuation or for Restoration.

By order of the Committee,

GEORGE B. SEYFANG.

Secretary.

No. 2, WHITE LION COURT, CORNHILL, LONDON, 1st July, 1869. HEADS, OUTSIDE PLATING, PILLARS, &c.

TABLE G. 1.

TABLE OF MINIMUM DIMENSIONS OF KEELS, STEMS, STERN POSTS, FRAMES, REVERSED FRAMES, FLOOR PLATES, BULKHEADS, OUTSIDE PLATING, PILLARS, &c.

		FRAMES FOR	ALL GRADES.			Plane	ter of				THICKNESS OF OUTSIDE PLATING FOR HALF-LENGTH AMIDSHIPS.									
NUMBERS.  For Frames, Reversed  OF		Dimensions of angle iron for three-	Dimensions of angle iron before	Dimensions of angle iron for Reversed frames,	Bulk-	solid pi	llars to	NUMBERS.  For Keel, Stem, Sternpost,	KEEL.	Stem and Stern-post for	Garboare	d Strakes.		From Garboard to	o the lower edge o	of sheerstrake.	Sheerstra	ke	From mair	
Frames, Bulkheads, and Pillars.	FRAMES. fifths the length of and ab	and abaft the three-fifths length.	and bulkheads, for all grades.	neaus.	Hold. Deck.		and Plating.	GRADES.	all grades.	100A	90A	80A	100A	90A	80 <b>A</b>	100 A 90 A	80A	Three decked vessels. all grades	vessels.	
31.5 and 37	not to ers are	inches. $2\frac{1}{2} \times 2\frac{1}{4} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{4} \times \frac{4}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$	inches.  4 16	imches.	inches. $2\frac{1}{4}$	2600 and 3400	inches. $6 \times 1\frac{1}{8}$	inches. $5\frac{1}{2} \times 1\frac{1}{8}$	inches. $30 \times \frac{6}{16}$	inches. $\frac{6}{16}$	inches. $\frac{5}{16}$	inches. $\frac{5}{16}$	inches. $\frac{4}{16} \& \frac{5}{16}$	inches. $\frac{4}{16}$	inches. $30 \times \frac{6}{16}$	6 16	inches.	inches.
37 and 45	o centre is the numb s.	$3 \times 2\frac{1}{2} \times \frac{5}{16}$	$3 \times 2\frac{1}{2} \times \frac{4}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$	4 16	_	$2\frac{1}{2}$	3400 and under 5200	$6\frac{3}{4} \times 1\frac{1}{4}$	$6 \times 1\frac{1}{4}$	" × 7/16	6 16	$\frac{6}{16}$	6 16	5 16	$\frac{4}{16} & \frac{5}{16}$	" × 1/6	6 16		
45 and 52	centre to; where t	$3 \times 3 \times \frac{6}{16}$	$3 \times 3 \times \frac{5}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	4 16	$2\frac{1}{2}$	238	5200 and 1200	$7 \times 1\frac{5}{8}$	$6\frac{1}{4} \times 1\frac{5}{8}$	" × 8/16	7 16	6 16	6 & 7 16	5 16 & 16	5 16	" × 8/16	7 16		
52 and 57	from nches iy be	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	$3\frac{1}{2} \times 3 \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	5 16	$2\frac{5}{8}$	23/8	7200 and under 8900	$7\frac{1}{4} \times 1\frac{7}{8}$	$6\frac{1}{2} \times 1\frac{7}{8}$	$_{"}$ $\times \frac{9}{16}$	8 16	7 16	7 16	$\frac{6}{16} \& \frac{7}{16}$	5 16 & 16	" X 3/16	8 16		
57 and dinder 61	f the frames may be 22 i 16600, it ma	$3\frac{1}{2} \times 3 \times \frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	$3 \times 2\frac{1}{2} \times \frac{6}{16}$	5 16	23/4	$2\frac{1}{2}$	8900 and under 10450	$7\frac{1}{2} \times 2\frac{1}{8}$	$6\frac{3}{4} \times 2\frac{1}{8}$	" × 9/16	8 16	7 16	$\frac{7}{16} & \frac{8}{16}$	7 1 6	$\frac{6}{16} \& \frac{7}{16}$	" × 10/16	9 16		
61 and dinder 65	space of the	$4 \times 3 \times \frac{7}{16}$	$4 \times 3 \times \frac{6}{16}$	$3 \times 3 \times \frac{6}{16}$	6 16	27/8	$2\frac{1}{2}$	10450 and under 11800	$7\frac{1}{2} \times 2\frac{1}{4}$	$7 \times 2\frac{1}{4}$	" × 9/16.	8 16	8 16	8 16	7 16 & 16	7 1 6	" × 10/16	1 6	6 16	6 16
65 and delinder 68	0, the span of the standard when a	$4 \times 3 \times_{\frac{7}{16}}$	$4 \times 3 \times \frac{6}{16}$	$3 \times 3 \times \frac{6}{16}$	6 16	3	$2\frac{1}{2}$	11800 and under 13100	8 ×2	$\frac{3}{8}$ 7 × 2 $\frac{3}{8}$	$_{"}$ $\times \frac{10}{16}$	9 16	8 16	8 16 & 9	7 16 & 16	716	$36 \times \frac{10}{16}$	9 16	6 16	6 16
68 and vinder 71	131 an	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	$4\frac{1}{2} \times 3 \times \frac{6}{16}$	$3 \times 3 \times \frac{6}{16}$	6 16	31/8	$2\frac{1}{2}$	13100 and 14300	8 ×2	$\frac{3}{3} 7_{\frac{1}{4}} \times 2_{\frac{3}{8}}$	$_{_{\prime\prime}}$ $\times \frac{10}{16}$	9 16	9 16	9 16	8 16	7 & 8 16	" × 11/6	10	6 16	6 1 6
. 71 and 73	not exceed not exceed e 23 inches;	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	$4\frac{1}{2} \times 3 \times \frac{6}{16}$	$3 \times 3 \times \frac{7}{16}$	6 16	31/8	$2\frac{1}{2}$	14300 and under 15500	8 ×2	$\frac{3}{8} 7\frac{1}{2} \times 2\frac{3}{8}$	$_{"}$ $\times \frac{11}{16}$	10	9 16	9 & 10	8 16 & 16	8 16	" × 11/16	10	7 16	7 16
73 and 76	G 1 do but do e may b	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	$3 \times 3 \times \frac{7}{16}$	6 16	$3\frac{1}{4}$	$2\frac{1}{2}$	15500 and 16600	$8\frac{1}{2} \times 2$	$\frac{1}{2} 8 \times 2\frac{1}{2}$	и X <u>11</u>	1016	9 16	9 8 10	9 16	8 16 & 9 16	$_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{$	116	7 1 6	7 16
76 and 80	Table (ve 7200, the spac	$5 \times 3 \times \frac{8}{16}$	$5 \times 3 \times \frac{7}{16}$	$3 \times 3 \times \frac{8}{10}$	7 16	$3\frac{1}{4}$	$2\frac{5}{8}$	16600 and 18700	9 ×2	$\left  \frac{1}{2} \right  \frac{81}{2} \times 2\frac{1}{2}$	$36 \times \frac{11}{16}$	10	10	1016	9 16 & 10	9 1 6	$40 \times \frac{12}{16}$	116	8 16	7 16
80 and 85	lbers in T are above 16600, th	$5 \times 3\frac{1}{2} \times \frac{8}{16}$	$5 \times 3\frac{1}{2} \times \frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{8}{16}$	7 16	338	$2\frac{5}{8}$	18700 and 21700	$9\frac{1}{2} \times 2$	$\frac{1}{2} 9 \times 2\frac{1}{2}$	$\frac{12}{16}$	11/16	10	10 & 116	10	9 & 10	" × 13/6		1 6	
85 and 92	the num re they xceeding	$5 \times 3\frac{1}{2} \times \frac{8}{16}$	$5 \times 3\frac{1}{2} \times \frac{7}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{10}$	7 T 6	$3\frac{1}{2}$	$2\frac{5}{8}$	21700 and 26400 under 26400	10 ×2	$\frac{23}{4}$ $10 \times 2\frac{5}{2}$	$\frac{3}{4}$ " $\times \frac{12}{16}$	116	1016	10 & 116	10/16	9 & 10	$\times \frac{13}{16}$			7 1 6
92 and 99	ls where the sheet whe sheet whe short not ex	$5\frac{1}{2} \times 3\frac{1}{2} \times \frac{9}{1}$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\frac{1}{6} \left  3\frac{1}{2} \times 3\frac{1}{2} \times \frac{3}{1} \right $	6 7	31/2	$2\frac{5}{8}$	26400 and and 30900	11 × 5	$\frac{23}{4}$ 11×25	$\frac{3}{4}$ " $\times \frac{12}{16}$	12/16	$-\frac{\frac{11}{16}}{}$	$-\frac{\frac{11}{16}}{}$	10 & 116	10/16	$_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{_{$			8 16
99 and 104	Vesse 71 inc 3100.	$6 \times 3\frac{1}{2} \times \frac{3}{1}$	$\frac{1}{6}$ 6 $\times 3\frac{1}{2} \times \frac{3}{1}$	$\frac{8}{6}$ 4 $\times 3\frac{1}{2} \times \frac{1}{2}$	$\frac{8}{16}$ $\frac{7}{1}$	3	25/8	30900 and under 35200	11 ×	3 11×3	" × 13	12/16	11/16	$\frac{12}{16}$	116	1016	$\frac{1}{1} \times \frac{13}{16}$		16	
104 and 115	In exceed 2		$\frac{0}{6}$ 6 $\times 3\frac{1}{2} \times 1$	$\frac{9}{6}$ $4\frac{1}{2} \times 3\frac{1}{2} \times$	9 1 1	3	$\frac{1}{2}$ $2\frac{5}{8}$	35200 and under 40200	0 11 ×	$3\frac{1}{4}$ $11 \times 3$		12		$\frac{\frac{12}{16} & \frac{13}{16}}{\text{ng, where two this}}$	1	$\frac{11}{16}$	$\times \frac{14}{16}$	1	$\frac{9}{16}$	

\*In the columns for plating, where two thicknesses are given, they are to be worked in alternate strakes, and the large thickness is to apply to the outer strakes, and the smaller one to the inner strakes: and the size of the rivets to be regulated by the thickness of the thickness of the thickness.

	to be regulated by
Till I de and all Till	TABLE FOR SIZES OF FLOORS. See Section 7.  Agines and Bölers of Steam Vessels to be one-sixteenth of an inch thicker than given in this Table.
NUMBERS 31 32 33 34 35 37 39 41 43 45 47 49 51 55  FOR and to	2 53 55 56 57 58 59 60 62 63 64 65 66 67 68 69 70 71 72 73 74 76 78 80 84 88 92 98 107 NUMBE 105 55 56 57 58 59 60 62 63 64 65 66 67 68 69 70 71 72 73 74 76 78 80 84 88 92 98 107 115 FLOOR
Sizes. $\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

MEM.—The Scantlings given in the above Table are intended for Vessels, the length of which does not exceed eight times their moulded breadth, or eleven times their depth from top of keel, see Section 1. For Ships which exceed these proportions, see Section 46. See also exceptions in Sections 41 and 42.

Thickness of Plates  Diameter of rivets for the different thickness of plates  Width of Butt Straps in double riveting for the respective rivets  """  """  """	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	diameter
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IRON VESSELS.

TABLE OF MINIMUM D

MI GERL WORL WIDEN OND NAME THOW ORDER IN

## IRON VESSELS.

## TABLE G. 2.

TABLE OF MINIMUM DIMENSIONS OF KEELSONS, STRINGERS, DECKS, RUDDERS, CEILING, AND WINDLASSES.

ALL PLATES, AND ALL BEAM AND ANGLE IRON, USED IN VESSELS INTENDED FOR CLASSIFICATION, ARE TO BE STAMPED LEGIBLY IN TWO PLACES, WITH THE MANUFACTURER'S TRADE MARK, OR HIS NAME, AND THE PLACE WHERE MADE.

	Size of	Thickness of inter- costal	Dimensions of angle irons on	Thickness of stringer and tie plates	Dimensions of angle irons on the middle, lower or		RUD	DER.			mess	Thick-		WIND	LASS.			
NUMBERS.  To regulate keelsons, stringers, decks, rudders,	middle-line keelsons standing upon floors,	keelson plates and side plates for	upper deck beam stringer plates in one and two-decked	upon main deck beams,* hooks, crutches,	hold, and orlop beam stringer plates, on upper deck stringer plates in	Sailing Vessels.		Steam Vessels.		upper	deck,	wood ceiling in hold,	Sailing	Vessels.	Steam	Vessels.	NUMBERS.  To regulate keelsons,	
ceiling, and windlasses.	for all grades.	box keelsons, for all grades.	vessels, also for keelsons, and stringers in hold, for all grades.	and rider plate to keelson, for all grades.	three-decked vessels and on spar-deck stringer plates, also for box keelsons, for all grades.	Diameter at the head.	Diameter at the heel.	Diameter at the head.	Diameter at the heel.	* Wood.	Iron.	to upper part of bilges.	Diameter of iron spindle.	Diameter of main piece.	Diameter of iron spindle.	Diameter of main piece.	stringers, decks, rudders, ceiling, and windlasses.	
2600 and under 3400	$7rac{1}{4} imesrac{6}{16}$	inches. $\frac{4}{16}$	$3 \times 3 \times \frac{6}{16}$	inches. $\frac{5}{16}$	$2\frac{3}{4} \times 2\frac{3}{4} \times \frac{6}{16}$	inches. $2\frac{7}{8}$	inches.	inches.	inches.	inches. $2\frac{1}{2}$	inches.	inches.	inches. $2\frac{1}{4}$	inches. $12\frac{1}{2}$	inches.	inches.	2600 and 3400	
3400 and 5200	$8\frac{1}{2} \times \frac{7}{16}$	$\frac{5}{16}$	$3 \times 3 \times \frac{6}{16}$	$\frac{6}{16}$	$3 \times 3 \times \frac{6}{16}$	3	2	$3\frac{1}{2}$	2	3		2	$\frac{2\frac{1}{2}}{2}$	14	$2\frac{1}{4}$	13	3400 and 5200	
5200 and 7200	$9\frac{3}{4} \times \frac{8}{16}$	$\frac{5}{16}$	$3 \times 3 \times \frac{6}{16}$	6 16	$3 \times 3 \times \frac{6}{16}$	$3\frac{1}{2}$	2	$3\frac{3}{4}$	$2\frac{1}{4}$	3	$\frac{5}{16}$	2	$2\frac{3}{4}$	15	$2\frac{1}{2}$	14	5200 and 7200	
7200 and 8900	$10\frac{3}{4} \times \frac{9}{16}$	$\frac{6}{16}$	$\boxed{3\frac{1}{2} \times 3 \times \frac{6}{16}}$	$\frac{7}{16}$	$3 \times 3 \times \frac{6}{16}$	$3\frac{3}{4}$	$2\frac{1}{4}$	$4\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	<u>5</u> 1 6	$2\frac{1}{2}$	3	16	$2\frac{3}{4}$	15	7200 and under 8900	
8900 and 10450	$11\frac{1}{2} \times \frac{9}{16}$	$\frac{6}{16}$	$4 \times 3 \times \frac{6}{16}$	7 16	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{6}{16}$	$4\frac{1}{4}$	$2\frac{1}{2}$	$4\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{2}$	5 16	$2\frac{1}{2}$	$3\frac{1}{4}$	17	$2\frac{3}{4}$	.15	8900 and 10450	
10450 and 11800	$12\frac{1}{4} \times \frac{10}{16}$	$\frac{7}{16}$	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	8 16	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	$4\frac{1}{2}$	$2\frac{3}{4}$	$4\frac{3}{4}$	$2\frac{3}{4}$	31/2	6 16	$2\frac{1}{2}$	$3\frac{1}{2}$	18	3	16	10450 and 11800	
11800 and 13100	$13 \times \frac{10}{16}$	$\frac{7}{16}$	$4\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	8 16	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	$4\frac{3}{4}$	$2\frac{3}{4}$	5	3	31	6 16	$2\frac{1}{2}$	358	19	$3\frac{1}{4}$	17	11800 and 13100	
13100 and 14300	$13\frac{1}{2} \times \frac{11}{16}$	7 16	$5 \times 3\frac{1}{2} \times \frac{7}{16}$	$\frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	5	3	$5\frac{1}{4}$	3	$3\frac{1}{2}$	$\frac{6}{16}$	$2\frac{1}{2}$	$3\frac{3}{4}$	20	$3\frac{1}{4}$	17	13100 and 14300	
14300 and $15500$	$14 \times \frac{11}{16}$	7 16	$5 \times 3\frac{1}{2} \times \frac{8}{16}$	$\frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	$5\frac{1}{4}$	3	$5\frac{1}{2}$	3	$3\frac{1}{2}$	6 16	$2\frac{1}{2}$	4	21	$3\frac{1}{2}$	18	14300 and 15500	
15500 and 16600	$15 \times \frac{12}{16}$	8 16	$5 \times 3\frac{1}{2} \times \frac{9}{16}$	9 16	$4 \times 4 \times \frac{8}{16}$	$5\frac{1}{2}$	3	$5\frac{3}{4}$	3	4	6 16	$2\frac{1}{2}$	41/4	22	$3\frac{5}{8}$	19	15500 and 16600	
16600 and under 18700	$16 \times \frac{12}{16}$	8 16	$5 \times 4 \times \frac{9}{16}$	1016	$4 \times 4 \times \frac{9}{16}$	$5\frac{3}{4}$	3	6	$3\frac{1}{4}$	4	6 16	$2\frac{1}{2}$	$4\frac{1}{2}$	23	$3\frac{5}{8}$	19	16600 and 18700	
18700 and 21700	$17\frac{1}{2} \times \frac{13}{16}$	8 16	$ 5\frac{1}{2} \times 4 \times \frac{9}{16} $	$\frac{10}{16}$	$4 \times 4 \times \frac{9}{16}$	6	$3\frac{1}{4}$	$6\frac{1}{2}$	$3\frac{1}{2}$	4	6 16	$2\frac{1}{2}$	$4\frac{5}{8}$	24	4	21	18700 and 21700	
21700 and 26400	$19 \times \frac{13}{16}$	$\frac{9}{16}$	$6 \times 4 \times \frac{9}{16}$	10	$4 \times 4 \times \frac{9}{16}$	$6\frac{1}{2}$	$3\frac{1}{2}$	$7\frac{1}{4}$	$3\frac{3}{4}$	4	6 16	$2\frac{1}{2}$	$4\frac{5}{8}$	$25\frac{1}{2}$	$4\frac{1}{2}$	23	21700 and 26400	
26400 and 30900	$21 \times \frac{14}{16}$	$\frac{9}{16}$	$6\frac{1}{2} \times 4 \times \frac{9}{16}$	10	$4 \times 4 \times \frac{9}{16}$	$7\frac{1}{4}$	$3\frac{3}{4}$	$7\frac{3}{4}$	4	4	6 16	$2\frac{1}{2}$	$4\frac{3}{4}$	27	$4\frac{5}{8}$	24	26400 and 30900	
30900 and 35200	$23 \times \frac{14}{16}$	10	$6\frac{1}{2} \times 4\frac{1}{2} \times \frac{9}{16}$	$\frac{10}{16}$	$4 \times 4 \times \frac{9}{16}$	$7\frac{3}{4}$	4	8	$4\frac{1}{2}$	4	7 16	$2\frac{1}{2}$	$4\frac{3}{4}$	$28\frac{1}{2}$	$4\frac{5}{8}$	$25\frac{1}{2}$	30900 and under 35200	
35200 and under 40200	$25 \times \frac{15}{16}$	10	$6\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	$\frac{10}{16}$	$4 \times 4 \times \frac{9}{16}$	8	$4\frac{1}{2}$	81/4	$4\frac{3}{4}$	4	7 16	$2\frac{1}{2}$	5	30	$4\frac{3}{4}$	27	35200 and under 40200	

<sup>\*</sup>The thickness of stringer and tie plates on beams, below the upper deck in vessels with one or two tiers of beams, and below the main or middle deck in vessels with three tiers of beams, may be one-sixteenth of an inch less in thickness than that given in the Table.

Mem.—The Scantlings given in the above Table are intended for Vessels, the length of which does not exceed eight times their moulded breadth, or eleven times their depth from top of keel, see Section 1. For Ships which exceed these proportions, see Section 46.

\* When the deck is of Teak, it may be one-sixth less in thickness.

DIAMETER OF NUT	r and Screw Bolts for Fastening
	FLAT OF DECK.
Deck under 3in.	3 inch
3in. and above	$\frac{1}{2}$ ,,

<sup>\*\*</sup>The top and bottom plates of box keelsons to be one-sixteenth of an inch more in thickness than the side plates.

IRON VESSELS.

TABLE OF MINIMUM D

MI GERL WORL WIDEN OND NAME THOW ORDER IN

LENGTH OF BEAM AMID- SHIPS.	BEAMS AMIDS DECKED VESS LOWER DECK	PER & LOWER DECK SHIPS IN ONE & TWO SELS, & OF MAIN AND K BEAMS IN THREE AR DECKED VESSELS.	AMIDSHIPS VESSELS,	PER DECK BEAMS * IN THREE-DECKED AND FOR RAISED RTER-DECKS.	SIZE OF SPAR-DECK BEAMS *			
Feet.	Bulb Iron, ins. ins.	Double Angle Irons. ins. ins. ins.	Bulb Iron. ins. ins.	Double Angle Irons. ins. ins.	Bulb Iron, ins. ins.	Double Angle Irons. ins. ins. ins.		
16	$4 \times \frac{4}{16}$	$2 \times 2 \times \frac{4}{16}$	.leasoV		n bins Adjust 11s			
18	$4\frac{1}{2} \times \frac{4}{16}$	$2 \times 2 \times \frac{4}{16}$	1 Parts - 1	and	alia aedon	Feet		
20	$5 \times \frac{5}{16}$	$2 \times 2 \times \frac{4}{16}$	GRO I	2	1 1 01	oor		
22	$5\frac{1}{2} \times \frac{5}{16}$	$2 \times 2 \times \frac{4}{16}$	020		1 1 1 0 0	0) 5		
24	$6 \times \frac{6}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	200					
26	$6\frac{1}{2} \times \frac{6}{16}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{5}{16}$	$5\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$5\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$		
28	$7 \times \frac{7}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$6 \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$5\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$		
30	$7\frac{1}{2} \times \frac{7}{16}$	$3 \times 2\frac{1}{2} \times \frac{5}{1.6}$	$6\frac{1}{2} \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$6 \times \frac{6}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$		
32	$8 \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	$6\frac{1}{2} \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$6 \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$		
34	$8\frac{1}{2}\times\frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	$7 \times \frac{7}{16}$	$2\frac{3}{4} \times 2\frac{1}{2} \times \frac{5}{16}$	$6\frac{1}{2} \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$		
36	$9 \times \frac{9}{16}$	$3\frac{1}{2}\times3$ $\times\frac{7}{16}$	$7\frac{1}{2}\times\frac{7}{16}$	$3 \times 2\frac{1}{2} \times \frac{5}{16}$	$6\frac{1}{2} \times \frac{6}{16}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{5}{16}$		
38	$9\frac{1}{2} \times \frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	$7\frac{1}{2} \times \frac{7}{16}$	$3 \times 2\frac{1}{2} \times \frac{5}{1.6}$	$7 \times \frac{7}{16}$	$2\frac{3}{4} \times 2\frac{1}{2} \times \frac{5}{16}$		
40	$10 \times \frac{10}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{1.6}$	$8 \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	$7\frac{1}{2} \times \frac{7}{16}$	$3 \times 2\frac{1}{2} \times \frac{5}{16}$		
42	$10\frac{1}{2} \times \frac{10}{16}$	$4 \times 3\frac{1}{2} \times \frac{7}{16}$	$8\frac{1}{2}\times\frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	$8 \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$		
44	$11 \times \frac{11}{16}$	$4 \times 4 \times \frac{8}{1.6}$	$9 \times_{\frac{9}{16}}$	$3 \times 3 \times \frac{7}{16}$	$8\frac{1}{2} \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{1.6}$		
46	$11\frac{1}{2}\times\frac{1}{1}\frac{1}{6}$	$4 \times 4 \times \frac{8}{1.6}$	$9\frac{1}{2} \times \frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	$8\frac{1}{2} \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$		
48	$12 \times \frac{12}{16}$	$4\frac{1}{2}\times4\frac{1}{2}\times\frac{9}{16}$	$9\frac{1}{2}\times\frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{7}{16}$	$9 \times \frac{9}{16}$	$3\frac{1}{4} \times 3\frac{1}{4} \times \frac{7}{16}$		

The size of all beams which are not less in length than three-fourths of the length of the midship beam, may be in proportion to their length as described above; all other beams must not be less than three-fourths the depth and thickness of the midship beam, excepting at hatchways exceeding in length four spaces of frames, mast and pall bitt beams, and beam under the heel of bowsprit, which must not be less in size than the midship beam.

<sup>\*</sup> The beams at hatchways exceeding in length eight spaces of frames, must be equal in size to those of the main deck.

## TABLE G4.

SHOWING THE BREADTH OF STRINGER PLATES UPON UPPER AND MAIN DECK BEAMS, FOR VESSELS WHOSE LENGTH DOES NOT EXCEED EIGHT TIMES THEIR BREADTH OR ELEVEN TIMES THEIR DEPTH FROM TOP OF KEEL;\* ALSO FOR LOWER DECK AND ORLOP BEAM STRINGER PLATES, AND FOR FORE AND AFT AND DIAGONAL TIE PLATES, FOR VESSELS OF ALL PROPORTIONS.

Length of Vessel.	Breadth of upper & main deck stringer for half length amidships.	Breadth of lower deck and orlop beam stringer in- side frame, and ends of upper and main deck stringer.	Breadth of fore and aft and diagonal tie plates upon beams amidships.	Length of Vessel.	Breadth of upper & main deck stringer amidships.	Breadth of lower deck stringer inside frame, and ends of upper and main deck stringers.	Breadth of fore and aft and diag onal tie plates upon beams amidships.
Feet.	Inches.	Inches.	Inches.	Feet.	Inches.	Inches.	Inches.
126	18	$13\frac{1}{2}$	6	245	35	$26\frac{1}{2}$	11½
133	19	14	6	252	36	27	12
140	20	15	$6\frac{1}{2}$	259	37	28	12
147	21	16	7	266	38	$28\frac{1}{2}$	$12\frac{1}{2}$
154	22	$16\frac{1}{2}$	7	273	39	29	13
161	23	17	$7\frac{1}{2}$	280	40	30	13
168	24	18	8	287	41	31	$13\frac{1}{2}$
175	25	19	81/2	294	42	$31\frac{1}{2}$	14
182	26	$19\frac{1}{2}$	9	301	43	32	14
189	27	20	9	308	44	33	$14\frac{1}{2}$
196	28	21	9	315	45	34	15
203	29	22	10	322	46	$34\frac{1}{2}$	15
210	30	$22\frac{1}{2}$	10	. 329	47	35	$15\frac{1}{2}$
217	31	23	10	336	48	36	16
224	32	24	$10\frac{1}{2}$	343	49	37	16
231	33	25	11	350	50	$37\frac{1}{2}$	$16\frac{1}{2}$
238	34	$25\frac{1}{2}$	11	357	51	38	17

Diagonal tie-plates on beams may be dispensed with if the deck stringer for three-fifths the length amidships be one inch in breadth for every five feet of the vessel's length, from thence they may be gradually reduced to three-fifths of that width at ends.

\* For breadth of stringers in vessels exceeding these proportions, see Section 46 of the Rules.

## Suggested SIZES AND SCANTLINGS FO

	TB,	9		2500	IR	O N ithout	M A	ST Irons.	S,	Pr di	egra	Canal
	н	PARTI	NERS.	HEE	EL.	Hour	NDS.	HE.	AD.		CHEEKS.	HU
	LENGTH.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick	Thick -ness of Plate.	Sizes of Angle Iron.	LENGTH
	48	17	$\frac{5}{16}$	13	$\frac{4}{16}$	$13\frac{1}{2}$	4 16	$11\frac{1}{2}$	3 16	$\frac{7}{16}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{6}{16}$	1
und.	51	18	5 16	13½	4 16	14	4 16	12	4 16	$\frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	1
the Ro	54	19	5 16	14	$\frac{4}{16}$	15	$\frac{4}{16}$	13	$\frac{4}{16}$	$\frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	1
ites in	57	20	$\frac{6}{16}$	15	$\frac{5}{16}$	16	$\frac{5}{16}$	$13\frac{1}{2}$	$\frac{4}{16}$	$\frac{8}{16}$	$4 \times 3 \times \frac{7}{16}$	1
Two plates in the Round.	60	21	$\frac{6}{16}$	16	5 16	17	5 16	14	5 16	8 16	$\boxed{4 \times 3 \times_{\frac{7}{16}}}$	1
Part	63	22	$\frac{6}{16}$	$16\frac{1}{2}$	$\frac{5}{16}$	18	5 16	15	5 16	$\frac{8}{16}$	$4 \times 3 \times \frac{7}{16}$	1
	66	23	$\frac{6}{16}$	17	$\frac{5}{16}$	$18\frac{1}{2}$	$\frac{5}{16}$	$15\frac{1}{2}$	5 16	8 16	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	2
und.	69	24	$\frac{6}{16}$	18	5 16	19	5 16	16	5 16	$\frac{8}{16}$	$\boxed{4\frac{1}{2} \times 3 \times \frac{7}{16}}$	2
the Ro	72	25	$\frac{6}{16}$	19	5 16	20	5 16	17	5 16	$\frac{8}{16}$	$\boxed{4\frac{1}{2} \times 3 \times \frac{7}{16}}$	2
Three Plates in the Round.	75	26	$\frac{7}{16}$	$19\frac{1}{2}$	6 16	21	6 16	$17\frac{1}{2}$	$\frac{6}{16}$	9 16	$\boxed{4\frac{1}{2} \times 3 \times \frac{8}{16}}$	2:
hree Pl	78	27	$\frac{7}{16}$	20	6 16	22	6 16	18	6 16	$\frac{9}{16}$	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	24
T.	81	28	$\frac{7}{16}$	21	$\frac{6}{16}$	$22\frac{1}{2}$	$\frac{6}{16}$	19	$\frac{6}{16}$	9 16	$\boxed{4\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}}$	2:
I.	84	29	$\frac{7}{16}$	22	$\frac{6}{16}$	23	$\frac{6}{16}$	19½	$\frac{6}{16}$	$\frac{9}{16}$	$\boxed{4\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}}$	21
Round	87	30	$\frac{7}{16}$	$22\frac{1}{2}$	$\frac{6}{16}$	24	$\frac{6}{16}$	20	$\frac{6}{16}$	$\frac{9}{16}$	$\boxed{5 \times 3\frac{1}{2} \times \frac{8}{16}}$	27
in_the	90	31	8 16	23	$\frac{7}{16}$	25.	$\frac{7}{16}$	21	6 16	$\frac{10}{16}$	$5 \times 3\frac{1}{2} \times \frac{9}{16}$	28
Four Plates in the Round.	93	32	8 16	24	$\frac{7}{16}$	26	$\frac{7}{16}$	$21\frac{1}{2}$	6 16	$\begin{array}{ c c }\hline 1 & 0 \\\hline 1 & 6 \\\hline \end{array}$	$5\frac{1}{2} \times 3\frac{1}{2} \times \frac{9}{16}$	29
Four	96	33	8 16	25	7 16	$26\frac{1}{2}$	$\frac{7}{16}$	22	6 16	$\begin{array}{ c c }\hline 1 & 0 \\\hline 1 & 6 \\\hline \end{array}$	$\boxed{5\frac{1}{2} \times 3\frac{1}{2} \times \frac{9}{16}}$	3(

Where Steamers

## TABLE G4.

SHOWING THE BREADTH OF STRINGER PLATES UPON UPPER AND MAIN DECK BEAMS, FOR VESSELS WHOSE LENGTH DOES NOT EXCEED EIGHT TIMES THEIR BREADTH OR ELEVEN TIMES THEIR DEPTH FROM TOP OF KEEL;\* ALSO FOR LOWER DECK AND ORLOP BEAM STRINGER PLATES, AND FOR FORE AND AFT AND DIAGONAL TIE PLATES, FOR VESSELS OF ALL PROPORTIONS.

Length of Vessel.	Breadth of upper & main deck stringer for half length amidships.	Breadth of lower deck and orlop beam stringer in- side frame, and ends of upper and main deck stringer.	man bidword . I . I .	Length of Vessel.	Breadth of upper & main deck stringer amidships.	Breadth of lower deck stringer inside frame, and ends of upper and main deck stringers.	Breadth of for and aft and dia onal tie plates upon beams amidships.
Feet.	Inches.	Inches.	Inches.	Feet.	Inches.	Inches.	Inches,
126	18	$13\frac{1}{2}$	6	245	35	$26\frac{1}{2}$	$11\frac{1}{2}$
133	19	14	6	252	36	27	12
140	20	15	$6\frac{1}{2}$	259	37	28	12
147	21	16	7	266	38	$28\frac{1}{2}$	$12\frac{1}{2}$
154	22	$16\frac{1}{2}$	7	273	39	29	13
161	23	17	$7\frac{1}{2}$	280	40	30	13
168	24	18	8	287	41	31	$13\frac{1}{2}$
175	25	19	81/2	294	42	$31\frac{1}{2}$	14
182	26	$19\frac{1}{2}$	9	301	43	32	14
189	27	20	9	308	44	33	$14\frac{1}{2}$
196	28	21	9	315	45	34	15
203	29	22	10	322	46	$34\frac{1}{2}$	15
210	30	$22\frac{1}{2}$	10	. 329	47	35	$15\frac{1}{2}$
217	31	23	10	336	48	36	16
224	32	24	$10\frac{1}{2}$	343	49	37	16
231	33	25	11	350	50	$37\frac{1}{2}$	$16\frac{1}{2}$
238	34	$25\frac{1}{2}$	11.	357	51	38	17

Diagonal tie-plates on beams may be dispensed with if the deck stringer for three-fifths the length amidships be one inch in breadth for every five feet of the vessel's length, from thence they may be gradually reduced to three-fifths of that width at ends.

\* For breadth of stringers in vessels exceeding these proportions, see Section 46 of the Rules.

# Suggested SIZES AND SCANTLINGS FOR MASTS AND BOWSPRITS OF FULL RIGGED STEAM VESSELS AND SAILING VESSELS.

		elidud		E 25		O N ithout	M Angle	Irons.	S,	T d	EEET8		IRO		BOW:	SPR:	ITS,	
	TH.	PART	NERS.	HEI	EL.	Hour	NDS.	HE	AD.		CHEEKS.	TH DE	BE	- SCHOOL STATE	HE	AND DESCRIPTION OF THE PARTY OF	CA	.Р.
	LENGTH.	Diam- eter.	Thick-ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick-ness.	Thick -ness of Plate.	Sizes of Angle Iron.	LENGTH OUTSIDE BED.	Diam- eter.	Thick -ness.	Diam- eter.	Thick	Diam- eter.	Thick -ness.
	48	17	$\frac{5}{16}$	13	$\frac{4}{16}$	$13\frac{1}{2}$	4 16	$11\frac{1}{2}$	3 16	$\frac{7}{16}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{6}{16}$	14	$17\frac{1}{2}$	$\frac{5}{16}$	$14\frac{1}{2}$	$\frac{5}{16}$	12	$\frac{4}{16}$
ound.	51	18	5 16	$13\frac{1}{2}$	4 16	14	4 16	12	$\frac{4}{16}$	$\frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	15	181	5 16	$15\frac{1}{2}$	$\frac{5}{16}$	$12\frac{1}{2}$	$\frac{5}{16}$
the Re	54	19	5 16	14	$\frac{4}{16}$	15	$\frac{4}{16}$	13	4 16	$\frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	16	20	5 16	$16\frac{1}{2}$	$\frac{5}{16}$	13	$\frac{5}{16}$
ates in	57	20	6 16	15	5 16	16	5 16	$13\frac{1}{2}$	$\frac{4}{16}$	8 16	$4 \times 3 \times \frac{7}{16}$	17	$21\frac{1}{2}$	$\frac{6}{16}$	18	$\frac{6}{16}$	14	$\frac{5}{16}$
Two plates in the Round.	60	21	6 16	16	5 16	17	5 16	14	$\frac{5}{16}$	8 16	$4 \times 3 \times \frac{7}{16}$	18	$22\frac{1}{2}$	$\frac{6}{16}$	19	$\frac{6}{16}$	15	$\frac{5}{16}$
	63	22	6 16	$16\frac{1}{2}$	5 16	18	5 16	15	5 16	8 16	$\boxed{4 \times 3 \times_{\frac{7}{16}}}$	19	24	$\frac{6}{16}$	20	$\frac{6}{16}$	16	$\frac{5}{16}$
	66	23	6 16	17	5 16	$18\frac{1}{2}$	$\frac{5}{16}$	$15\frac{1}{2}$	$\frac{5}{16}$	8 16	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	20	25	$\frac{6}{16}$	21	$\frac{6}{16}$	$16\frac{1}{2}$	$\frac{6}{16}$
ound.	69	24	$\frac{6}{16}$	18	5 16	19	5 16	16	$\frac{5}{16}$	8 16	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	21	$26\frac{1}{2}$	$\frac{6}{16}$	22	$\frac{6}{16}$	$17\frac{1}{2}$	$\frac{6}{16}$
the K	72	25	$\frac{6}{16}$	19	5 16	20	5 16	17	$\frac{5}{16}$	8 16	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	22	$27\frac{1}{2}$	6 16	23	6 16	$18\frac{1}{2}$	$\frac{6}{16}$
Inree Plates in the Round.	75	26	$\frac{7}{16}$	19½	6 16	21	6 16	$17\frac{1}{2}$	$\frac{6}{16}$	$\frac{9}{16}$	$\boxed{4\frac{1}{2} \times 3 \times \frac{8}{16}}$	23	29	$\frac{7}{16}$	24	$\frac{7}{16}$	19	$\frac{6}{16}$
Inree F	78	27	7 16	20	$\frac{6}{16}$	22	6 16	18	6 16	9 16	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	24	30	$\frac{7}{16}$	25	7 16	20	6 16
	81	28	$\frac{7}{16}$	21	6 16	$22\frac{1}{2}$	6 16	19	$\frac{6}{16}$	$\frac{9}{16}$	$4\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	25	$31\frac{1}{2}$	7 16	26	$\frac{7}{16}$	21	6 16
nd.	84	29	$\frac{7}{16}$	22	6 16	23	6 16	$19\frac{1}{2}$	$\frac{6}{16}$	9 16	$4\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	26	$32\frac{1}{2}$	$\frac{7}{16}$	27	$\frac{7}{16}$	$21\frac{1}{2}$	6 16
ie Kou	87	30	$\frac{7}{16}$	$22\frac{1}{2}$	6 16	24	6 16	20	$\frac{6}{16}$	9 16	$5 \times 3\frac{1}{2} \times \frac{8}{16}$	27	34	8 16	28	7 16	22	6 16
rlates in the Kound,	90	31	8 16	23	7 16	25.	$\frac{7}{16}$	21	6 16	10	$5 \times 3\frac{1}{2} \times \frac{9}{16}$	28	35	8 16	29	7 16	23	6 16
	93	32	8 16	24	$\frac{7}{16}$	26	7 16	$21\frac{1}{2}$	6 16	10	$5\frac{1}{2} \times 3\frac{1}{2} \times \frac{9}{16}$	29	$36\frac{1}{2}$	8 16	30	7 16	24	6 16
FOR	96	33	8 16	25	$\frac{7}{16}$	$26\frac{1}{2}$	$\frac{7}{16}$	22	6 16	$\frac{10}{16}$	$5\frac{1}{2} \times 3\frac{1}{2} \times \frac{9}{16}$	30	$37\frac{1}{2}$	8 16	31	$\frac{7}{16}$	25	6 16

	1			D T	E E I	Angle	AS'	rs,						STEI		BOW it Angle	SPI	RITS	,
TH.	PART	NERS.	HE	EL.	HOU	NDS.	HE	AD.		C	HEEK	s.	LH DE	BE		1	EL.	1	AP.
LENGTH.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Thick -ness of Plate.		Size An Iro	s of gle on.	LENGTH OUTSIDE BED.	Diam- eter.	Thick	Diam- eter.	Thick-ness	Diam-	Thie-nes
48	17	4 16	13	3 16	$13\frac{1}{2}$	$\frac{3}{16}$	$11\frac{1}{2}$	$\frac{3}{16}$	$\frac{6}{16}$	3	$\times 2$	$\frac{1}{2} \times \frac{4}{16}$	14	$17\frac{1}{2}$	$\frac{4}{16}$	$14\frac{1}{2}$	4 16	12	4 16
51	18	4 16	$13\frac{1}{2}$	$\frac{3}{16}$	14	$\frac{3}{16}$	12	$\frac{3}{16}$	$\frac{6}{16}$	3	$\times 2$	$\frac{1}{2} \times \frac{4}{16}$	15	$18\frac{1}{2}$	$\frac{4}{16}$	$15\frac{1}{2}$	$\frac{4}{16}$	$12\frac{1}{2}$	$\frac{4}{16}$
54	19	$\frac{4}{16}$	14	3 16	15	3 16	13	$\frac{3}{16}$	$\frac{6}{16}$	3	$\times 2$	$\frac{1}{2} \times \frac{4}{16}$	16	20	$\frac{4}{16}$	$16\frac{1}{2}$	$\frac{4}{16}$	13	$\frac{4}{16}$
57	20	<sup>5</sup> / <sub>16</sub>	15	$\frac{4}{16}$	16	$\frac{4}{16}$	$13\frac{1}{2}$	$\frac{4}{16}$	$\frac{7}{16}$	3	$\times 2$	$\frac{1}{2} \times \frac{4}{16}$	17	$21\frac{1}{2}$	$\frac{5}{16}$	18	$\frac{4}{16}$	14	$\frac{4}{16}$
60	21	$\frac{5}{16}$	16	$\frac{4}{16}$	17	$\frac{4}{16}$	14	$\frac{4}{16}$	$\frac{7}{16}$	3	$\times 2$	$\frac{1}{2} \times \frac{5}{16}$	18	$22\frac{1}{2}$	5 16	19	$\frac{4}{16}$	15	$\frac{4}{16}$
63	22	$\frac{5}{16}$	$16\frac{1}{2}$	$\frac{4}{16}$	18	$\frac{4}{16}$	15	$\frac{4}{16}$	$\frac{7}{16}$	$3\frac{1}{2}$	$\times$ 3	$\times \frac{5}{16}$	19	24	5 16	20	$\frac{4}{16}$	16	$\frac{4}{16}$
66	23	$\frac{5}{16}$	17	$\frac{4}{16}$	$18\frac{1}{2}$	$\frac{4}{16}$	$15\frac{1}{2}$	$\frac{4}{16}$	$\frac{7}{16}$	$3\frac{1}{2}$	$\times 3$	$\times \frac{5}{16}$	20	25	5 16	21	$\frac{4}{16}$	$16\frac{1}{2}$	5 16
69	24	$\frac{5}{16}$	18	$\frac{4}{16}$	19	$\frac{4}{16}$	16	$\frac{4}{16}$	$\frac{7}{16}$	$3\frac{1}{2}$	$\times$ 3	$\times \frac{6}{16}$	21	$26\frac{1}{2}$	5 16	22	$\frac{4}{16}$	$17\frac{1}{2}$	5 16
72	25	$\frac{5}{16}$	19	$\frac{4}{16}$	20	$\frac{4}{16}$	17	4 16	$\frac{7}{16}$	4	$\times$ 3	$\times \frac{6}{16}$	22	$27\frac{1}{2}$	5 16	23	$\frac{4}{16}$	$18\frac{1}{2}$	5 16
75	26	$\frac{6}{16}$	$19\frac{1}{2}$	$\frac{5}{16}$	21	$\frac{5}{16}$	$17\frac{1}{2}$	4 16	8 16	4	$\times 3$	$\times \frac{6}{16}$	23	29	6 16	24	$\frac{5}{16}$	19	5 16
78	27	$\frac{6}{16}$	20	5 16	22	5 16	18	$\frac{4}{16}$	8 16	4	$\times$ 3	$\times \frac{6}{16}$	24	30	6 16	25	$\frac{5}{16}$	20	$\frac{5}{16}$
81	28	$\frac{6}{16}$	21	5 16	$22\frac{1}{2}$	5 16	19	5 16	8 16	$4\frac{1}{2}$	$\times 3$	$\times \frac{6}{16}$	25	$31\frac{1}{2}$	6 16	26	5 16	21	5 16
84	29	$\frac{6}{16}$	22	5 16	23	5 16	$19\frac{1}{2}$	5 16	8 16	$4\frac{1}{2}$	$\times 3$	$\times \frac{6}{16}$	26	$32\frac{1}{2}$	6 16	27	6 16	$21\frac{1}{2}$	6 16
87	30	6 16	$22\frac{1}{2}$	5 16	24	5 16	20	5 16	8 16	$4\frac{1}{2}$	$\times 3$	$\times \frac{6}{16}$	27	34	7 16	28	6 16	22	6 16
90	31	$\frac{7}{16}$	23	6 16	25	$\frac{6}{16}$	21	$\frac{5}{16}$	9 16	$4\frac{1}{2}$	$\times 3$	$\times \frac{6}{16}$	28	35	7 16	29	6 16	23	6 16
93	32	$\frac{7}{16}$	24	6 16	26	6 16	$21\frac{1}{2}$	5 16	9 1 6	$4\frac{1}{2}$	$\times 3\frac{1}{2}$	$\times \frac{7}{16}$	29	$36\frac{1}{2}$	$\frac{7}{16}$	30	6 16	24	6 16
96	33	$\frac{7}{16}$	25	$\frac{6}{16}$	$26\frac{1}{2}$	6 16	22	5 16	$\frac{9}{16}$	$4\frac{1}{2}$	$\times 3\frac{1}{2}$	$\times \frac{7}{16}$	30	$37\frac{1}{2}$	$\frac{7}{16}$	31	6 1 6	25	6 16

Where Steamers are intended to be fitted with masts or a bowsprit for auxiliary purposes, they might be one-eighth less in diameter than prescribed by Table.

## Suggested SIZES AND SCANTLINGS FOR YARDS AND TOPMASTS OF FULL RIGGED STEAM VESSELS AND SAILING VESSELS.

		7,8		O N	Y A	R D	,					IRO		TOPI			8
LENGTH.	CEN	TRE.	1st Qu	arter.	2nd Q	uarter.	3rd Q	arter.	EN	DS.	LENGTH.	HE	EL.		r part	HE	AD.
LEN	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	LEN	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.
32	8	3 16	$7\frac{7}{8}$	3 16	$7\frac{1}{4}$	3 16	6	3 16	4	$\frac{2}{16}$	32	$11\frac{1}{2}$	3 16	$7\frac{1}{4}$	3 16	$6\frac{1}{2}$	$\frac{2}{16}$
36	9	3 16	83/4	3 16	81/8	$\frac{3}{16}$	$6\frac{3}{4}$	3 16	$4\frac{1}{2}$	$\frac{2}{16}$	34	$12\frac{1}{4}$	$\frac{3}{16}$	$7\frac{1}{2}$	$\frac{3}{16}$	$6\frac{3}{4}$	$\frac{2}{16}$
40	10	3 16	$9\frac{3}{4}$	3 16	9	3 16	$7\frac{1}{2}$	3 16	5	$\frac{2}{16}$	36	$12\frac{3}{4}$	$\frac{4}{16}$	8	$\frac{4}{16}$	7	$\frac{3}{16}$
44	11	3 16	$10\frac{3}{4}$	3 16	10	3 16	81/4	3 16	$5\frac{1}{2}$	2 T6	38	$13\frac{1}{2}$	$\frac{4}{16}$	$8\frac{1}{2}$	$\frac{4}{16}$	$7\frac{1}{2}$	$\frac{3}{16}$
48	12	4 16	$11\frac{3}{4}$	4 16	103/4	3 16	9	3 16	6	$\frac{2}{16}$	40	$14\frac{1}{2}$	4 16	9	4 16	8	$\frac{3}{16}$
52	13	4 16	125/8	4 16	$11\frac{3}{4}$	3 16	$9\frac{3}{4}$	3 16	$6\frac{1}{2}$	$\frac{2}{16}$	42	15	$\frac{4}{16}$	$9\frac{1}{2}$	$\frac{4}{16}$	81/4	$\frac{3}{16}$
56	14	4 16	135	4 16	$12\frac{5}{8}$	4 16	$10\frac{1}{2}$	3 16	7	$\frac{2}{16}$	44	$15\frac{3}{4}$	$\frac{4}{16}$	10	$\frac{4}{16}$	$8\frac{3}{4}$	$\frac{3}{16}$
60	15	4 16	145	4 16	$13\frac{1}{2}$	4 16	1114	3 16	$7\frac{1}{2}$	$\frac{2}{16}$	46	$16\frac{1}{2}$	$\frac{5}{16}$	$10\frac{1}{2}$	$\frac{4}{16}$	9	$\frac{4}{16}$
64	16	5 16	$15\frac{5}{8}$	5 16	$14\frac{3}{8}$	5 16	12	$\frac{4}{16}$	8	$\frac{3}{16}$	48	$17\frac{1}{2}$	5 16	11	$\frac{4}{16}$	$9\frac{1}{2}$	$\frac{4}{16}$
68	17	5 16	$16\frac{1}{2}$	5 16	$15\frac{1}{4}$	5 16	$12\frac{3}{4}$	4 16	81/2	$\frac{3}{16}$	50	181/4	$\frac{5}{16}$	$\overline{11\frac{1}{2}}$	4 16	10	$\frac{4}{16}$
72	18	5 16	$17\frac{1}{2}$	5 16	$16\frac{1}{4}$	5 16	$13\frac{1}{2}$	$\frac{4}{16}$	9	3 16	52	19	$\frac{6}{16}$	12	5 16	$10\frac{1}{2}$	$\frac{5}{16}$
76	19	5 16	$18\frac{1}{2}$	5 16	$17\frac{1}{8}$	$\frac{5}{16}$	$\overline{14\frac{1}{4}}$	4 16	$9\frac{1}{2}$	$\frac{3}{16}$	54	$19\frac{3}{4}$	$\frac{6}{16}$	$12\frac{1}{2}$	$\frac{5}{16}$	11	$\frac{5}{16}$
80	20	5 16	$19\frac{1}{2}$	5 16	18	5 16	15	4 16	10	$\frac{3}{16}$	56	$20\frac{1}{2}$	$\frac{6}{16}$	13	5 16	$11\frac{1}{2}$	$\frac{5}{16}$
84	21	6 16	$20\frac{1}{2}$	6 16	19	5 16	$15\frac{3}{4}$	5 16	$10\frac{1}{2}$	$\frac{4}{16}$	58	21	$\frac{6}{16}$	$13\frac{1}{2}$	5 16	$11\frac{3}{4}$	$\frac{5}{16}$
88	22	6 16	$21\frac{1}{2}$	6 16	193/4	5 16	$16\frac{1}{2}$	5 16	11	$\frac{4}{16}$	60	22	$\frac{6}{16}$	14	5 16	$12\frac{1}{4}$	$\frac{5}{16}$
92	23	6 16	$22\frac{1}{2}$	6 16	$20\frac{3}{4}$	6 16	$17\frac{1}{4}$	5 16	$11\frac{1}{2}$	4 16	62	$22\frac{3}{4}$	$\frac{6}{16}$	$14\frac{1}{2}$	$\frac{5}{16}$	$12\frac{3}{4}$	$\frac{5}{16}$
96	24	$\frac{6}{16}$	$23\frac{3}{8}$	6 16	$21\frac{5}{8}$	6 16	18	5 16	12	4 16	64	$23\frac{1}{2}$	$\frac{6}{16}$	15	5 16	13	$\frac{5}{16}$

				E E I	Y Angl		DS,	MO	HI			STE		TOP		STS,	N A tun
этн.	CEN	TRE.	1st Qu	arter.	2nd Qu	iarter.	3rd Qu	arter.	EN	DS.	LENGTH.	HE	EL.	Lower o He	f	HE.	AD.
LENGTH.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.		Thick -ness.	Diam- eter.	Thick -ness.	LEN	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick-ness
32	8	$\frac{3}{16}$	$7\frac{7}{8}$	$\frac{3}{16}$	$7\frac{1}{4}$	3 16	6	$\frac{2}{16}$	4	$\frac{2}{16}$	32	$11\frac{1}{2}$	$\frac{3}{16}$	$7\frac{1}{4}$	$\frac{3}{16}$	$6\frac{1}{2}$	$\frac{2}{16}$
36	9	$\frac{3}{16}$	83/4	$\frac{3}{16}$	81/8	$\frac{3}{16}$	$6\frac{3}{4}$	$\frac{2}{16}$	$4\frac{1}{2}$	$\frac{2}{16}$	34	$12\frac{1}{4}$	$\frac{3}{16}$	$7\frac{1}{2}$	$\frac{3}{16}$	$6\frac{3}{4}$	$\frac{2}{16}$
40	10	$\frac{3}{16}$	$9\frac{3}{4}$	$\frac{3}{16}$	9	$\frac{3}{16}$	$7\frac{1}{2}$	$\frac{2}{16}$	5	$\frac{2}{16}$	36	$12\frac{3}{4}$	$\frac{3}{16}$	8	$\frac{3}{16}$	7	$\frac{2}{16}$
44	11	3 16	$10\frac{3}{4}$	$\frac{3}{16}$	10	$\frac{3}{16}$	81/4	$\frac{3}{16}$	$5\frac{1}{2}$	$\frac{2}{16}$	38	$13\frac{1}{2}$	$\frac{3}{16}$	$8\frac{1}{2}$	$\frac{3}{16}$	$7\frac{1}{2}$	$\frac{2}{16}$
48	12	$\frac{4}{16}$	$11\frac{3}{4}$	$\frac{4}{16}$	$10\frac{3}{4}$	$\frac{4}{16}$	9	$\frac{3}{16}$	6	$\frac{2}{16}$	40	$14\frac{1}{2}$	$\frac{3}{16}$	9	3 16	8	$\frac{2}{16}$
52	13	4 16	$12\frac{5}{8}$	$\frac{4}{16}$	$11\frac{3}{4}$	4 16	$9\frac{3}{4}$	$\frac{3}{16}$	$6\frac{1}{2}$	$\frac{2}{16}$	42	15	$\frac{3}{16}$	$9\frac{1}{2}$	$\frac{3}{16}$	81/4	$\frac{3}{16}$
56	14	4 16	$13\frac{5}{8}$	4 16	$12\frac{5}{8}$	$\frac{4}{16}$	$10\frac{1}{2}$	$\frac{3}{16}$	7	$\frac{2}{16}$	44	$15\frac{3}{4}$	$\frac{3}{16}$	10	3 16	83/4	$\frac{3}{16}$
60	15	$\frac{4}{16}$	145/8	$\frac{4}{16}$	$13\frac{1}{2}$	$\frac{4}{16}$	$11\frac{1}{4}$	3 16	$7\frac{1}{2}$	$\frac{2}{16}$	46	$16\frac{1}{2}$	$\frac{4}{16}$	$10\frac{1}{2}$	$\frac{3}{16}$	9	$\frac{3}{16}$
64	16	$\frac{4}{16}$	$15\frac{5}{8}$	$\frac{4}{16}$	$\overline{14\frac{3}{8}}$	$\frac{4}{16}$	12	$\frac{3}{16}$	8	$\frac{2}{16}$	48	$17\frac{1}{2}$	$\frac{4}{16}$	11	$\frac{3}{16}$	$9\frac{1}{2}$	$\frac{3}{16}$
68	17	$\frac{4}{16}$	$16\frac{1}{2}$	$\frac{4}{16}$	$15\frac{1}{4}$	$\frac{4}{16}$	$12\frac{3}{4}$	3 16	$8\frac{1}{2}$	$\frac{2}{16}$	50	$18\frac{1}{4}$	$\frac{4}{16}$	$11\frac{1}{2}$	$\frac{3}{16}$	10	3 16
72	18	$\frac{4}{16}$	$17\frac{1}{2}$	$\frac{4}{16}$	161/4	$\frac{4}{16}$	$13\frac{1}{2}$	3 16	9	2 16	52	19	5 16	12	$\frac{4}{16}$	$10\frac{1}{2}$	3 16
76	19	$\frac{4}{16}$	$18\frac{1}{2}$	$\frac{4}{16}$	$17\frac{1}{8}$	$\frac{4}{16}$	$14\frac{1}{4}$	3 16	$9\frac{1}{2}$	2 16	54	$19\frac{3}{4}$	5 16	$12\frac{1}{2}$	$\frac{4}{16}$	11	$\frac{3}{16}$
80	20	$\frac{4}{16}$	$19\frac{1}{2}$	$\frac{4}{16}$	18	$\frac{4}{16}$	15	3 16	10	$\frac{2}{16}$	56	$20\frac{1}{2}$	5 16	13	4 16	$11\frac{1}{2}$	$\frac{3}{16}$
84	21	5 16	$20\frac{1}{2}$	$\frac{5}{16}$	19	5 16	$15\frac{3}{4}$	$\frac{4}{16}$	$10\frac{1}{2}$	$\frac{3}{16}$	58	21	$\frac{5}{16}$	$13\frac{1}{2}$	$\frac{4}{16}$	$11\frac{3}{4}$	$\frac{3}{16}$
88	22	5 16	$21\frac{1}{2}$	$\frac{5}{16}$	$19\frac{3}{4}$	5 16	$16\frac{1}{2}$	4 16	11	$\frac{3}{16}$	60	22	$\frac{5}{16}$	14	$\frac{4}{16}$	$12\frac{1}{4}$	3 16
92	23	<u>5</u> 16	$22\frac{1}{2}$	$\frac{5}{16}$	$20\frac{3}{4}$	$\frac{5}{16}$	$17\frac{1}{4}$	4 16	$11\frac{1}{2}$	$\frac{3}{16}$	62	$22\frac{3}{4}$	5 16	$14\frac{1}{2}$	$\frac{4}{16}$	$12\frac{3}{4}$	$\frac{3}{16}$
96	24	$\frac{5}{16}$	$23\frac{3}{8}$	$\frac{5}{16}$	$21\frac{5}{8}$	5 16	18	$\frac{4}{16}$	12	$\frac{3}{16}$	64	$23\frac{1}{2}$	$\frac{5}{16}$	15	$\frac{4}{16}$	13	3 16

Where Steamers are intended to be fitted with topmasts or yards for auxiliary purposes, they might be one-eighth less in diameter than prescribed by Table.

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## Suggested SIZES AND SCANTLINGS FOR YAF

Challes pressure process		er,a	IRO		Y A Angle				ST		1 1/4	IRO]
LENGTH.	CEN	FRE.	1st Qu	arter.	2nd Qu	arter.	3rd Qu	arter.	ENI	os.	LENGTH.	HEE
LEI	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	Diam- eter.	Thick -ness.	LE	Diam-
32	. 8	$\frac{3}{16}$	778	3 16	$7\frac{1}{4}$	3 16	6	3 16	4	$\frac{2}{16}$	32	$11\frac{1}{2}$
36	9	$\frac{3}{16}$	834	3 16	81/8	$\frac{3}{16}$	$6\frac{3}{4}$	3 16	$4\frac{1}{2}$	$\frac{2}{16}$	34	$12\frac{1}{4}$
40	10	$\frac{3}{16}$	$9\frac{3}{4}$	3 16	9	3 16	$7\frac{1}{2}$	$\frac{3}{16}$	5	$\frac{2}{16}$	36	$12\frac{3}{4}$
44	11	3 16	1034	$\frac{3}{16}$	10	3 16	81/4	$\frac{3}{16}$	$5\frac{1}{2}$	2 16	38	$13\frac{1}{2}$
48	12	$\frac{4}{16}$	1134	4 16	103	3 16	9	3 16	6	$\frac{2}{16}$	40	$14\frac{1}{2}$
52	13	$\frac{4}{16}$	$12\frac{5}{8}$	4 16	$11\frac{3}{4}$	3 16	$9\frac{3}{4}$	3 16	$6\frac{1}{2}$	$\frac{2}{16}$	42	15
56.	14	$\frac{4}{16}$	$13\frac{5}{8}$	4 16	$12\frac{5}{8}$	4 16	$10\frac{1}{2}$	3 16	7	$\frac{2}{16}$	44	$15\frac{3}{4}$
60	15	$\frac{4}{16}$	$14\frac{5}{8}$	$\frac{4}{16}$	$13\frac{1}{2}$	4 16	1114	$\frac{3}{16}$	$7\frac{1}{2}$	$\frac{2}{16}$	46	$16\frac{1}{2}$
64	16	5 16	$15\frac{5}{8}$	5 16	1438	5 16	12	4 16	8	$\frac{3}{16}$	48	$\boxed{17\frac{1}{2}}$
68	17	5 16	$16\frac{1}{2}$	5 16	$15\frac{1}{4}$	5 16	$12\frac{3}{4}$	$\frac{4}{16}$	$8\frac{1}{2}$	$\frac{3}{16}$	50	181/4
72	18	5 16	$17\frac{1}{2}$	5 16	$16\frac{1}{4}$	5 16	$13\frac{1}{2}$	4 16	9	3 16	52	19
76	19	$\frac{5}{16}$	$18\frac{1}{2}$	5 16	$17\frac{1}{8}$	5 16	141/4	4 16	$9\frac{1}{2}$	3 16	54	$19\frac{3}{4}$
80	20	5 16	$19\frac{1}{2}$	5 16	18	5 16	15	$\frac{4}{16}$	10	3 16	56	$\boxed{20\frac{1}{2}}$
84	21	$\frac{6}{16}$	$20\frac{1}{2}$	6 16	19	5 16	$15\frac{3}{4}$	5 16	$10\frac{1}{2}$	4 16	58	21
88	22	6 16	$21\frac{1}{2}$	6 16	$19\frac{3}{4}$	5 16	$16\frac{1}{2}$	5 16	11	4 16	60	22
92	23	6 16	$22\frac{1}{2}$	6 16	$20\frac{3}{4}$	6 16	$17\frac{1}{4}$	5 16	$11\frac{1}{2}$	4 16	62	$22\frac{3}{4}$
96	24	6 16	$23\frac{3}{8}$	$\begin{array}{ c c }\hline 6\\\hline 16\\ \end{array}$	$21\frac{5}{8}$	6 16	18	5 16	12	$\frac{4}{16}$	64	$23\frac{1}{2}$

Where Steamers are intended to be fitt

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## INDEX

TO

## SUGGESTIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF COMPOSITE SHIPS.

	<del></del>	-	
Section		Section.	
9.	Apron	11.	Keel Plate
19.	Beams	6.	— Wood
19.	— Middle Deck	17.	Keelsons, Bilge
19.	—— Hold	16.	——— Box
19.	—— Orlop	16.	——— Intercostal
18.	—— Spacing of	16.	Middle-line
33.	Bolts	16.	——— Vertical Centre Plate
37.	—— Deck	36.	Knight Heads
	—— Copper or Yellow Metal	20.	Pillars
Page 79.	—— Galvanized Iron	32.	Planking
Page 79.	—— Plain Iron	34.	— of Two Thicknesses
Sec. 31.	—— Butt Plates of Outside Planking	36.	Planksheer
30.	Butt Straps	23.	Poops and Forecastles
35.	Caulking	3.	Quality of Iron, Maker's Name, and
38.	Ceiling		Workmanship
41.	Cement	4.	Rivets and Riveting
40.	Chain Plate and Preventer Bolts	39.	Rudder
9.	Deadwood	39.	——— Braces
37.	Decks	5.	Scantlings
22.	—— Raised Quarter	8.	Stem
24.	Deck Houses	8.	Stern Post
24.	Decked, Spar	9.	Inner
18.	—— Two	28.	Stringer Plates
18.	—— Three	2.	Surveys, Common while Building
21.	Engine Room and Boiler Space	1.	—— Special while Building
13.	Floor Plates	43.	—— Periodical during Classification
23.	Forecastles and Poops	44.	—— Vessels not Built under
12.	Frames	29.	Tie Plates
15.	—— Reversed	23.	Tonnage
10.	Spacing of	Page 79.	Vessels Built under Roof
25.	—— Iron Sheer Strake on	Sec. 44.	Vessels with Wooden Floors, &c.
26.	—— Iron Bilge Strake on	5.	—— above 10 depths of Hold, &c.
27.		42.	having partial deficiences, &c.
7.		14.	Watercourses
29.	Hatchways and Mast Partners	28.	
36.	Hawse Timbers	36.	

#### SUGGESTIONS

FOR

## THE CONSTRUCTION AND CLASSIFICATION

OF

## COMPOSITE SHIPS.

All vessels constructed with iron frames, or part iron and wood frames, and wood planking, to be classed A for a term of years, according to the timber material used in their construction, as set forth in Table I, provided the workmanship be well executed, subject to the surveys and conditions hereinafter stated.

#### VESSELS BUILT UNDER A ROOF.

An additional year will be allowed to vessels built under a substantial and efficient roof, kept in good repair, and which extends on each side beyond the vessel's breadth, and beyond each of her ends to an extent equal to half her midship breadth.

#### COPPER OR YELLOW METAL BOLTS.

Two additional years will be allowed to vessels, whether planked with one or two thicknesses, if fastened with wrought copper or yellow metal bolts, from the lower part of keel up to the height of one-fifth of the midship depth of hold, below the upper side of the upper deck and parallel thereto forward and aft, in one, two, or three-decked ships, and below the upper side of the main or tonnage deck in spar-decked ships, but the whole of the fastenings above this height may be of iron, if properly galvanized, and dowelled or cemented over.

Such ships to be marked C. F. (Copper fastened).

#### IRON BOLTS AND GALVANIZED IRON BOLTS.

Vessels will be allowed to be fastened with galvanized or plain iron bolts, if efficiently dowelled or cemented over; but the butt bolts, and also those which are used in fastening the fore hood ends before the iron stem plate, the after hood ends abaft the sternpost plate, extending from the keel up to the height of one-fifth the depth of hold below the upper side of the upper deck, in one, two, or three decked vessels, or below the upper side of the main or tonnage deck in spar decked vessels, those which fasten the planking to the dead wood, the lower edge of the garboard strakes, and the wood keel, and stem scarphs, must be of wrought copper or yellow metal.

All vessels fastened with galvanized iron to be marked G. I. B. (Galvanized Iron Bolts), and with plain iron bolts (I. B.); and in addition all Iron fastened Ships will be marked "Expl. T. S.," (Experimental,

Triennial Survey).

All vessels fastened with galvanized or plain iron bolts in the bottom, previous to being sheathed with copper or yellow metal, must be sheathed with wood not less than 1½in. thick, wrought hot on the best hair felt, and properly rabbeted into the stem, sternpost, keel, and into the planking at its upper edge; efficiently fastened to the bottom planks with yellow metal or copper nails, arranged to come between the frames, and be well caulked. The condition of the bolts and caulking of the bottom and planking to be ascertained at the periodical Surveys, as per Section 43. The wood sheathing to be allowed to remain on the bottom as long as the bottom planks, bolts, and caulking prove satisfactory.

#### SURVEYS WHILE BUILDING.

#### SPECIAL SURVEY ..

Section 1. The Surveyors are to examine the whole of the materials and the workmanship as it progresses, from the laying of the keel to the completion of the vessel, and to point out as early as possible anything that may be objectionable.

#### COMMON SURVEY.

Section 2. First.—Examination of the wood keel, stem, sternpost, deadwood, and frames before they are painted or coated.

Second.—Of all the beams, stringers, plates, &c., when in place, riveted-up ready to receive the planking. Third.—When the vessel is planked outside, dubbed fair, and all the fastenings completed, but before she is either caulked, coated, or cemented, so that the inside and outside of the planking, and the bolts and their nuts, may be carefully examined.

Fourth.—When the vessel is caulked, but before the bolt-heads are cemented or have dowells fitted

over them.

Fifth.—When the vessel is completed, launched, and equipped.

## SUGGESTIONS AS TO THE BUILDING OF COMPOSITE SHIPS. QUALITY OF IRON, MAKER'S NAME, AND WORKMANSHIP.

Section 3. The whole of the iron to be of good malleable quality, to be capable of bearing a longitudinal strain of twenty tons per square inch, and all plate, beam, and angle iron, to be legibly stamped in not less than two places with the manufacturer's trade mark, or his name, and the place where made, which is also to be stated in the Report of survey.

Any brittle or inferior iron, defective planking, timber, or other objectionable materials to be rejected.

The workmanship to be well executed, and submitted to the closest inspection before coating or painting.

#### RIVETS AND RIVETING.

Section 4. The rivets to be of the best quality, and to be of the diameter as per Table H, the rivet holes to be regularly and equally spaced, and carefully punched opposite each other in the adjoining parts from the faying services in the laps, lining pieces, butt straps, and frames, and to be countersunk where

required; the rivets not to be nearer to the butts or edges of the plating, lining pieces to butts, or of any angle iron, than a space equal to their own diameter, and not to be further apart from centre to centre than five times their diameter, or nearer than four times their diameter from centre to centre, and to be spaced through the frames and outside plating, and in reversed angle iron a distance equal to nine times their diameter from centre to centre.

All butts of iron plating, excepting those of poops and top-gallant forecastles, to be at least double riveted, and a space equal to twice the diameter of the rivets to be between each row; where treble riveting is adopted, a space equal to twice the diameter of the rivet to be between each row, with half the number of rivets in the back row.

#### SCANTLINGS.

Section 5. The scantlings given in Table H are intended for ships the length of which, measured from the fore part of stem to the after part of the stern post, on the range of the upper deck, does not exceed ten times their depth of hold, taken from the upper part of the floors to the top of the upper deck beams, or seven times their moulded breadth.

In vessels exceeding ten depths, or seven breadths in length, the builders are to submit their plans for giving them additional longitudinal strength to the Committee, through the Resident Surveyors, who are to express their opinions thereon.

The depth for defining the proportions of spar decked vessels is to be measured from the top of the floor-plates to the upper side of the middle or tonnage deck beams. (See Section 24.)

#### WOOD KEEL.

**Section 6.** The wood keel to be of the dimensions set forth in Table H, to be free from all defects, the scarphs to be either vertical or horizontal, and to be tabled, the width of the tabling to be one-third the siding or moulding of the keel, as the case may be, and from  $\frac{3}{4}$  of an inch to  $1\frac{1}{4}$  inch deep, according to the size of the keel, and bolted with copper or yellow metal bolts, which are to be driven on and elenched on rings of the same metal; the bolts are to be in size and number as required by Table K.

#### GARBOARD STRAKE.

**Section 7.** The garboard strakes not to be less than two-thirds the depth of keel prescribed in Table H, and properly rabbeted into it, to be fitted closely to the iron keel plate, and to be of sufficient width. The butts of the garboard strake to have not less than four feet six inches shift from the butts of the garboard strake on the opposite side of the vessel, nor less than the same shift clear of the keel scarphs. For bolting, see Section 33.

#### STEM AND STERNPOST.

Section 8. The stem and sternpost to be of the dimensions set forth in Table H, and of materials according to class as prescribed in Table I. Where necessary to scarph the stem, it must be a flat scarph, and its length not less than seven-tenths of that prescribed in Table K for keel scarphs, and tabled and bolted in the same manner. The hood ends to be well and efficiently rabbeted into the stem and sternpost.

#### APRON, INNER STERN-POST, AND DEADWOOD.

Section 9. The apron, inner sternpost, and deadwood, to be of materials according to class as

prescribed in Table I; the apron and inner sternpost to be of sufficient siding and moulding for the knight-heads and counter timbers respectively, to be secured to them, and to take the hood end fastenings.

#### SPACING OF IRON FRAMES.

Section 10. The spacing of the iron frames not to exceed 18 inches from moulding edge to moulding edge all fore and aft, a four feet length of angle iron, the size of the frame, is to be riveted to each floor and to the keel plate, back to back with the frame.

#### KEEL PLATE.

Section 11. The keel plate to be of the breadth and thickness prescribed in Table H, and to be made continuous up the apron and up the inner sternpost as high as practicable, but in all cases to extend above the lower deck or hold beam stringer angle iron. Forward and aft the plate is to be curved to the form of the bearding line, and to be one-sixteenth of an inch thicker than prescribed in the Table, where it passes over the deadwoods, apron, and inner sternpost; and to be sided as required by the form of the vessel, to have an angle iron of the size given in Table H for stringer angle irons riveted on each edge, flanged to the form of the vessel to receive the plank fastenings. The keel plate to maintain its breadth for three-fifths the length of the keel in midships, and then to be gradually reduced until its edges conform with the flange of the angle iron on the keel plate forward and aft; the butts of the keel plates to be shifted clear of the keel scarphs.

#### FRAMES.

Section 12. The frames to be of the dimensions set forth in Table H, and the narrow flange to be of a parallel thickness, and the bolts are to be so placed that the nuts of the screw bolts may fit closely to the frames; the frames to be in as long lengths as possible, fitted and riveted on to the keel plate, and extended as near to the middle line as practicable, according to the plan of construction adopted, and in all cases to extend to the gunwale, and where raised quarter deeks, poops, forecastles, and spar deeks are constructed to extend to their deek stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; if the frames be welded, the welds to be perfect with not less than four feet shifts from the welds of next frames, or if butted, to have not less than four feet shifts with four feet lengths of angle iron of the same size as the frames, fitted back to back, riveted to them, and secured to the outside planking.

#### FLOOR-PLATES.

Section 13. The floor-plates to be in thickness according to Table H, but at each end of the vessel, for one quarter of her length, they may be reduced one-sixteenth of an inch where the midship floor-plates are six-sixteenths and under ten-sixteenths of an inch, and two-sixteenths of an inch where the plates are ten-sixteenths and above in thickness.

The depth of the floor-plates at middle line to be regulated by the following rule, viz., to the vessel's depth, measured from the top of the keel to the top of the upper or spar deck beams amidships add the extreme breadth of the vessel, two-fifths of that sum in inches to be the depth of the floor-plates at the middle line well fore and aft, but at the extreme fore and after ends they must be deeper, so as to form an efficient connection between the two sides of the vessel.

The floor-plates are to extend up the bilges not less than to a perpendicular height of twice and a half the depth of floors amidships, from upper side of keel at middle line; and in no case to be less moulded in any part than a fair taper between the depth at middle line, and the moulding at their extreme ends, which is to be not less than the moulding of the frames. The ends of the floors to maintain the height prescribed amidships, for one quarter of the vessel's length; they may then be gradually lowered forward and aft until the upper edges of the floor-plates are level, which place is to be determined by the form of the vessel, and from that point to the vessel's ends they are to be gradually increased in depth, so as to efficiently connect the sides of the vessel; the upper parts of the floors forward and aft are to be high enough to give ample room between the reverse frames on each side of the vessel for fitting the keelson angle irons.

In vessels having considerable rise of floor, the depth of the floor-plates on a square at the quarter of the vessel's extreme moulded breadth, set out from the middle line, is to be not less than three-fifths the depth of the floor-plate at the middle line, and the floor-plate is to be extended up the bilges by a fair taper from middle line, until it terminates at the moulding of the frames.

A floor-plate to be fitted and riveted to every frame and to be extended across the middle line, but where a vertical centre plate is adopted at middle line, then the floor-plates are to be efficiently connected to it on each side by double vertical angle irons of not less size than the reversed frames.

When floors extend from side to side, and are made in two lengths, the butts are to have double butt straps, one on each side of the floor-plates, and three-fourths the thickness of the floor-plates, or else the floor-plates must be lapped and treble riveted.

#### WATERCOURSES.

Section 14. Watercourses are to be formed through all the floor-plates, on each side of the middle line, and at the bilges above the frames, so as to allow water to reach the pumps freely, and also through the vertical centre plate, and intercostal keelsons when such keelsons are adopted.

#### REVERSED FRAMES.

Section 15. Reversed angle irons on frames to be in size as per Table H. All vessels under 200 tons to have reversed angle iron riveted to every frame and floor plate across the middle line, extended to the height of the upper part of the bilge, and to the gunwale on alternate frames, and to have double reversed angle irons in way of all keelsons and stringers in hold; and in addition all vessels of 200 tons and upwards, to have reversed angle iron extended to the upper deck beam stringer on alternate frames, and where raised quarter decks and spar decks are constructed, to their deck stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; and on the remaining frames reversed angle irons are to be fitted to above the height of the lower deck or hold beam stringer angle iron if the vessel has two decks or tiers of beams, and to above the height of the middle deck beam stringer angle iron if the vessel has three decks or tiers of beams; the rivets for securing the reversed angle iron to the frames and floor-plates to be in diameter as specified in Table H, and be spaced not to exceed a distance of nine times their own diameter from centre to centre; butts of reversed angle iron to be secured with butt straps.

#### MIDDLE LINE KEELSON.

Section 16. The middle line keelson, if of single plate, and standing above the floor-plates, to be of the thickness prescribed in Table H, to be two-thirds of the depth of floor-plates, and to have an angle iron, of the size given in Table H, fitted and riveted on each side, top and bottom, extending all fore and aft, the bottom angle irons to be riveted to a foundation plate the breadth of which is to be not less than three and a half times the flange of the angle iron fitted upon it, and the top angle irons to a rider plate on the top, the breadth of which is to be not less than the breadths of the flanges of the angle irons attached to them and the thickness of the keelson plates combined, to be properly shifted, and to be of the thickness given in Table H for box keelson plates, and the lower plates to be riveted to double reversed angle irons attached to each of the floors; but the foundation plate may be dispensed with if the combined widths of the horizontal flanges of the bottom angle irons are equal to the breadth prescribed for the foundation plate, and double riveted to the angle irons on the floors.

#### BOX KEELSON.

If a box keelson be adopted, it is to be formed of plates, properly shifted, of the thickness given in Table H, with a foundation plate, the depth of the box to be not less than two-thirds the depth of the floor plates, and the breadth of it, two-thirds of its depth; the lower angle irons of the box keelson to be of the size given for the frames, and the top ones the size of the reversed frames, and the keelson to be well stayed in way of the masts.

#### INTERCOSTAL KEELSON.

If an intercostal keelson be adopted, it is to be of the thickness prescribed in Table H, and riveted to vertical angle irons of not less size than the reversed frames attached to all floor plates, the plates to extend from the keel plate to the top of the floors, a bulb plate of not less thickness than the lower deck beams, or other bars of equal strength, to be let down below the top of the floors sufficiently for the intercostal plates to be riveted to them; in all cases these bars are to be fitted between two longitudinal angle irons on the floors, extending all fore and aft, of the size given for keelson angle iron in Table H, and riveted thereto. The intercostal plates to be fitted close to the floors, and to the flat keel plate.

#### VERTICAL CENTRE PLATE.

If the middle line keelson be formed of a vertical centre plate, extending from the keel plate to the top of the floors, it must be not less in thickness than that given in Table H, riveted to two fore and aft angle irons of the size given for stringer angle irons in Table H, attached to the keel plate. To strengthen the floor-plates transversely at their intersection at the middle line, in addition to double vertical angle irons, of not less size than the reversed frames, riveted to their ends, and to the vertical centre plate, there is to be a flat keelson plate of the same breadth and thickness as the keel plate, riveted to double reversed angle irons on the upper edge of floors, and to two fore and aft angle irons of the size given for stringer angle irons in Table H, on the top edge of the vertical centre plate; but should the vertical centre plate be extended above the upper edge of the floors, then it is to be riveted to two fore and aft angle irons of the size given in Table H, for stringer angle irons, and to two flat plates of the thickness given for box keelson plates, and half the breadth of the keel plates, one on each side of the middle line, which are to be well riveted to double reversed angle irons on

the top of each floor, one of these reversed angle irons to reeve through the vertical centre plate, and in all cases the vertical centre plate to be extended to the stem and sternpost plates, and riveted thereto.

#### BILGE KEELSONS AND STRINGERS.

Section 17. All vessels to have bilge keelsons fitted and riveted to double reversed angle irons to each floor, secured in an efficient manner, and to extend all fore and aft, and placed at the lower turn of the bilges according to the form of the bottom; to be formed of double angle irons of the size given in Table H, with bulb plate not less than the size given for hold beams, fitted between them for one-half the length of the vessel in midships; and in addition, in vessels of 300 tons and under 700 tons, a stringer will be required between the bilge keelson and hold beams, formed of double angle irons back to back, well riveted to double reversed angle irons and to each other; at the fore and after ends of the vessel the bilge keelson and stringer angle irons to be efficiently connected by plates forming hooks and crutches, which are to be properly riveted to the apron and inner sternpost plates; and such vessels to have intercostal plates fitted midway between the main and bilge keelsons, for three-fifths the vessel's length of keel in midships, these plates to be the thickness of the floor-plates, and connected thereto with angle irons of the size of the reversed frames.

In vessels of 700 tons and under 1,000 tons, in addition to the foregoing, a bulb plate, not less in thickness than the hold beams, is to be let down and riveted to the side intercostal plates, to be inserted between double angle irons on the top of the floors of the size given for stringer angle irons in Table H, and to be extended for three-fifths the length of the keel in midships, but the double angle irons to extend as far forward and aft as practicable.

In vessels of 1,000 tons and upwards, of a depth not requiring orlop beams, in addition to the foregoing, another stringer must be introduced formed of double angle irons fitted back to back to extend fore and aft, and riveted to double reversed angle irons and to each other; this stringer and the one below it are to be arranged so as to be equally spaced between the bilge keelson and hold beams, and a foundation plate, of the same thickness as the floors, is to be fitted for three-fifths the vessel's length of keel amidships under the bilge keelson, to be riveted to double reversed frames to the floors, and to which the bilge keelson is to be riveted. The breadth of the foundation plate is not to be less than three and a half times the flange of the angle iron fitted upon it.

Where bulb iron is used for keelsons or stringers, the joins to be overlapped and riveted; the length of the overlap must not be less than the depth of the bulb plate, but iron of other form than bulb may be used for them if of equal strength.

All angle irons for keelsons and stringers are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron or plate iron not less than two feet long, fitted in the throat of them, properly riveted to each flange, and the thickness of the connecting plates not to be less than the angle irons they connect.

#### SPACING OF BEAMS.

Section 18. The spacing of the upper deck beams in no case to exceed 4 feet 6 inches from centre to centre.

Vessels of 11 feet depth of hold and under, to have a stringer formed of double angle irons back to

back, of the size given in Table H, placed midway between the floors and deck beams, fitted and riveted to reversed angle iron attached to each frame, to extend all fore and aft, and connected by plates at the ends forming hook and crutch, which are to be secured to the apron and inner sternpost.

Vessels over 11 and under 13 feet depth of hold, to have a hold beam stringer plate of the same thickness as the upper deck stringer plate, but only two-thirds its breadth, efficiently secured to the side by an angle iron riveted to it and to the reversed frames of the size given in Table H for stringer angle iron, to extend all fore and aft, and to be properly connected at the fore and after ends. Bracket or knee plates to be fitted and riveted to the stringers at alternate frames on the under side, and the inner edge of the stringer plate to be stiffened by an angle iron of the same size as given for the reversed angle iron on the frames; or if preferred, a stringer may be formed of bulb plate of the size given for hold beams fitted between two stringer angle irons, passing all fore and aft, properly riveted to double reversed angle iron on the frames, and to each other, or, a stringer may be introduced of any other form of equal strength.

Vessels of 13 feet and under 15 feet depth of hold, to have a hold beam under every alternate upper deck beam.

Vessels of 15 feet depth of hold and under 18 feet, to have hold or lower deck beams spaced not more than 4 feet 6 inches, and nine feet from centre to centre alternately, and always to be placed under upper deck beams.

And in vessels of 18 feet depth of hold and above, a hold or lower deck beam to be placed under every upper deck beam.

PANTING (TO PREVENT).

In vessels exceeding 12 feet in depth from the lower side of the lower deck beams, and having fine ends, extra beams will be required both forward and aft between the lower deck beams and floors to prevent "panting," the sizes, arrangement, and security of them to be to the satisfaction of the Surveyors.

#### TWO-DECKED VESSELS WITH ORLOP BEAMS.

All two-decked vessels exceeding 24 feet in depth from the top of the floors to the upper side of the upper deck beams, and three-decked vessels exceeding 24 feet to the upper side of the middle deck beams, and where the depth from the under side of the lower deck beams exceeds 15 feet, such vessels to have orlop beams under every second lower deck beam with a stringer plate on their ends, of the same breadth and thickness as the lower deck stringer, passing all fore and aft, supported by brackets riveted to every other frame between the beams; the orlop beams to be secured to lugs welded to the lower deck beam pillars; but in the case of flush-deck ships, a depth of 25 feet will be allowed, provided the lower hold does not exceed 16 feet in depth from the under side of lower deck beams. Should a house be constructed on such flush-deck ship, for lodging crew or for store room, the same not to extend within 10 feet of the sternpost.

#### THREE-DECKED VESSELS.

In vessels having three decks, viz., upper, middle, and lower, and where cargo may be carried on the middle and lower decks, the beams, iron sheerstrake, upper deck stringers, and stringer angle irons and flat of upper deck are to bear the same proportion to the vessel's dimensions as in those having two decks, and the middle and lower deck beams, and stringers, are to be of the same size in proportion to the

vessel's length and breadth, as they would be in the lower deck of a vessel having only two decks; but one-sixth reduction will be allowed in the thickness of the outside planking, for one-fifth of the depth of hold below the upper deck stringer.

In all cases the middle deck is to be perfectly laid and caulked.

#### BEAMS.

Section 19. Beams to be of bulb plate with double angle irons on the top edge, or of T bulb iron, or of any other approved form of equal strength.

The upper deck beams to be one quarter of an inch in depth to every foot in length of the midship beam, and to be in thickness one-sixteenth of an inch for every inch in depth, with one-sixteenth of an inch added; if of T bulb the united breadth of the top flanges to be not less than three-fourths the depth of the beam, and where beams are formed of bulb plate with double angle irons on the top edge, the flanges of each of the angle irons are not to be less in their united breadth than three-fourths the depth of the beam, and to be one-sixteenth of an inch in thickness for every inch of the two sides of the angle iron.

#### MIDDLE-DECK, HOLD, AND ORLOP BEAMS.

Middle-deck, hold, and orlop beams to be one-eighth of the depth deeper, and one-sixteenth of an inch thicker than the upper deck beams.

All beams to be efficiently connected to the frames by bracket ends, or knee plates, the arms of each to be not less than twice and a half the depth of the beams in length, and of not less thickness than the beams.

#### PILLARS.

Section 20. All beams for at least three-quarters the length of the vessel in midships to be pillared, and in addition, the beams under the bowsprit, pall bitt, windlass, and capstan are to be pillared; the pillars to have not less than two rivets in each of their ends, so as to form a continuous tie from the keelson to the upper deck, or spar deck, and to be of the sizes given in Table H.

#### ENGINE-ROOM AND BOILER SPACE.

Section 21. In the construction of steam vessels, care must be taken that the engine and boiler bearers are properly constructed, and where they might interfere with the longitudinal strength of the vessel, they must be extended a sufficient distance beyond the engine and boiler space to compensate for such interruption; and after the machinery and boilers are fitted, as many hold or lower deck beams are to be introduced as may be practicable, and knee or bracket plates are to be added and riveted to the stringer plates, and to alternate frames which have no beams in the said space, and the vessel is to be otherwise made secure where necessary in the engine room, to the satisfaction of the Surveyors.

#### RAISED QUARTER DECKS.

Section 22. The frames in all cases, and reversed angle iron on alternate frames, where practicable, are to extend to the raised quarter deck stringer.

A reduction of one-half in the breadth and one-fifth in the thickness will be allowed for the sheerstrake of the raised quarter deck, and one-fifth in the scantlings, of the beams, stringers, stringer angle iron, and

flat of deck of raised quarter deck, from that given in Table H for the upper deck of such ships; one-fifth reduction will also be allowed for the outside planking, or plating, of the raised quarter deck from that given for topsides in Table H.

The upper deck beam stringer plate is to maintain its breadth to the break of the quarter deck, and then it may be gradually reduced in breadth until it terminates at the sixth frame abaft the break, and the upper deck sheerstrake plate is to extend to the stern.

#### POOPS AND FORECASTLES.

Section 23. In full poops and top-gallant forecastles, the frames are to be extended to their stringer plates; a reduction of one-fourth will be allowed from the dimensions required by Table H for the upper deck sheerstrake, stringer plate, angle iron on stringers, beams, and flat of deck; the same reduction will be allowed for the outside planking, or plating, of the poop or forecastle, from the thickness given for topsides in Table H; where plating alone is adopted, it need not in any case exceed six-sixteenths of an inch in thickness, and may be single riveted. An iron or wood spirketting to be fitted and efficiently secured and caulked in the poop and forecastle, to prevent water from going into the 'tween decks. The united lengths of poop and forecastle not to exceed three-fifths of the entire length of the upper deck.

Where the poop or the forecastle is constructed of a rounded form at the gunwale, the frames need not extend beyond the lower part of the curve, and the beams may be of plain angle iron not less in dimensions than the size required in Table H for the main frames, one to be placed to every alternate frame, to scarph the main frames with not less than two feet lengths and be properly riveted to them; the breast beams are not to be less in size than the angle iron for stringers prescribed in Table H, with an angle iron of the size of the reversed frames riveted to them, and the rounded gunwale when not intended to be planked over, its plating must be of the thickness required for sheerstrakes of poops; but when intended to be planked over, the thickness prescribed for the stringer plates on beams of poops will be sufficient, in either case the plating must extend the breadth of the rounded form, and in such cases stringers on beam ends will not be required.

## TONNAGE, HAVING REFERENCE TO SCANTLINGS, &c.

In flush-decked vessels having either one, two, or three decks (not being spar or awning decked), the tonnage under the upper deck, without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels, is to regulate all the scantlings of the hull, and also the equipment of the vessel.

In vessels having a raised quarter deck, or a poop, or top-gallant forecastle, or deck houses, or awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull; but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, with the addition of the tonnage of the space required for propelling power, is to regulate the equipment, and also the size of the main piece of rudder and windlass, and the keel and keelsons and their number, and the scantling of the stringer plates on the upper and lower deck beams, and the requirements as to double riveting.

But in vessels where the tonnage of the erections above the tonnage deck is less than that required for crew space, then the difference between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment and the size of the main piece of rudder and windlass, and the keel and keelsons and their number,

the scantling of the stringer plates on the upper and lower deck beams, and the requirements for double riveting.

#### SPAR-DECKED VESSELS.

Section 24. A spar-decked vessel is one having three decks or tiers of beams, where the space between the main and the spar deck is to be used only for the accommodation of crew and passengers, or to enclose the engine openings of steam vessels. The total depth of such vessels, measured from the top of floor-plates to the top of spar deck beams in midships, must not exceed thirteen-sixteenths, nor be less than twelve-sixteenths of the ship's extreme breadth. All frames and reverse angle irons on alternate frames are to extend to the spar deck stringer plate, except when constructed with a rounded form at the gunwale, then they may terminate at the lower part of the curve, but the reverse angle irons on the remaining frames are required to extend above the height of the main deck waterway or spirketting; in such ships the gross tonnage below the main or tonnage deck is to regulate all scantlings below this deck, but the total tonnage is to regulate the scantlings of the keelsons and their number, the stringers in the hold, the size of the main piece of rudder, and windlass.

These vessels are to have a main or middle complete deck, perfectly laid and caulked, and a main or middle deck iron sheerstrake, each of the thickness prescribed by Table H, and the main deck stringer plate is to be fitted and connected to the iron sheerstrake by angle iron between the frames of the size given for stringers, and in addition an inner stringer angle iron passing continuously fore and aft must be riveted to the reversed frames and to the main deck stringer plate. The upper part of the sheerstrake is to be not less in height than the main deck waterway or spirketting, as the case may be, and the space between the waterway, or spirketing, and the sheerstrake, all fore and aft, is to be filled in and made water-tight.

In such vessels a reduction of one-fourth from the dimensions required by Table H for the corresponding parts in the range of the upper deck in ships with two decks will be allowed from the dimensions of all beams, stringers, thickness of deck, and the outside planking, or plating, from the main deck upwards. If plating alone be adopted between the main and spar decks, the thickness need not exceed six-sixteenths of an inch in any case, the butts to be *double* riveted, but the edges may be single riveted.

When the spar deck is constructed of a rounded form at the gunwale, the beams may be of plain angle iron, if fitted to alternate frames, not less in dimensions than the sizes required in Table H for the main frames, to scarph the main frames with not less than two feet lengths, and be properly riveted to them. All hatchway and mast beams are to be of increased strength, and if of plain angle iron not to be less than the sizes given for stringer angle irons in Table H, with other angle irons of the size of the reversed frames riveted to them back to back. The rounded gunwale to be plated and properly constructed to the satisfaction of the Surveyor.

#### DECK HOUSES.

Deck houses or other erections will be allowed on a spar deck, but only to the extent of one-tenth its total superficial area; they are not to exceed seven feet in height, nor be placed nearer to either end of the vessel than one-fifth of her extreme length.

Vessels to which the Rule applies as regards an entire spar deck, will be noted in the Register Book thus, "Spar decked."

#### EQUIPMENT.

The tonnage, as per Section 23, is to regulate the equipment. (See also Table No. 22.)

#### STEAM SHIPS .- BOILERS AND MACHINERY.

In ships navigated by steam, the boilers and machinery are to be considered as part of the equipment, and, unless the Surveyors are satisfied of their efficiency, the figure 1 will be withheld.

#### IRON SHEERSTRAKE.

Section 25. The iron sheerstrake to be one inch in breadth for every six feet of the vessel's length, for half her length in midships, and to be of the thickness given in Table H; it may then be gradually reduced in breadth and in thickness to three-fourths of the midship breadth and thickness at her ends.

The butts of the iron sheerstrake in all cases to be shifted clear of the butts of the stringer plates on the beam ends, the shift in no case to be less than equal to three spaces of frames, and all plates where practicable to be not less than nine feet long, but if the sheerstrake plates are eighteen feet long they may be of two equal breadths, but carvel plated and single riveted; butts of all plating to be fitted quite close, and in no case is the lower edge of the iron sheerstrake to be fitted less than two-thirds of the breadth required by the Rule for sheerstrake, below the upper deck stringer plate. The butt straps in all cases to be in one piece, whether fitted outside or inside, and in no case to be in two pieces by being cut at the stringer plate. (See Section 30.)

#### IRON BILGESTRAKE.

Section 26. The bilge strake plates to be two-thirds the breadth of the iron sheerstrake, for three-fifths the length of the keel in midships, and from thence to the ends of the vessel they are to be reduced gradually to one-half their midship breadth; the thickness of the plates to be as prescribed in Table H, and they are to be fitted at the bilges with the middle of the plate at the height prescribed for floorheads, such position for the bilge plates to be maintained, notwithstanding that the floorheads may be carried higher. They are to be extended to the ends of the vessel in accordance with her form, and properly riveted to the frames.

#### DIAGONAL PLATES ON FRAMES.

Section 27. The diagonal plates on the frames to be not less than one-third the breadth of the iron sheerstrake, and fitted in pairs, transversely, all fore and aft, at an angle of 45°, with the butts of each pair meeting between the frames; to be of the thickness given in Table H, and connected to the sheer and bilge strake plates by butt straps, double riveted, and to be efficiently riveted to each other, and to each frame they cross.

#### STRINGER PLATES ON ENDS OF BEAMS.

Section 28. All vessels to have stringer plates of the thickness given in Table H upon the ends of each tier of beams. Those upon the ends of the upper deck beams of one, two, and three-decked vessels, to be in width one inch for every seven feet of the vessel's entire length, for half her length in midships, and from thence to the ends of the vessel they may be gradually reduced to three-fourths the width in midships; in no case, however, is the width in midships to be less than eighteen inches. The stringer plates are to be riveted to the beams and properly shifted, fitted home, and riveted to the iron sheerstrake, with an

angle iron of the dimensions given in Table H, and the roughtree stanchions are not to pass through them. Stringer plates on the ends of beams below the upper deck may be reduced in width to three-fourths the midship breadth of the upper deck stringer, which breadth is to extend all fore and aft, and to have an angle iron of the dimensions given in Table H, extending all fore and aft, riveted to reverse angle iron on each frame and to the stringer plates.

In cases where a deck is not laid, and the width of the stringer plate on ends of hold beams is objected to, it may be reduced in width, provided such reduction be fully compensated for.

All stringer angle irons are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron, or plate iron, not less than two feet long, fitted in the throat of them, properly riveted to each flange, and the thickness of the connecting plates not to be less than that of the angle iron they cover.

#### GUTTER WATERWAYS.

Upper deck gutter waterways are to be flooded to asscertain if there be any leakage, and when completed they are to be properly cemented.

#### TIE-PLATES.

Section 29. All vessels are to have tie-plates ranging all fore and aft upon each side of the hatchways on each tier of beams, and in addition thereto the beams of the upper and middle decks in three-decked or spar-decked vessels, and of the upper deck in vessels of one or two decks, must have tie plates fitted from side to side diagonally, in number, one pair for about every thirty-five feet of the vessel's length; these plates in both cases must not be less in width than once and a half the depth of the beams of their respective decks, and of the thickness required for stringer plates; they are to be well riveted to each other and to the beams and stringers, and to have intermediate fastenings into the deck plank between the beams. In all cases their butts to be chain riveted.

Upon hold beams where a deck is not to be laid, a tie formed of double angle iron, of the size given for the main frames of the ship, may be fitted each side of the hatchways in lieu of tie-plates; but if the beams are made of such additional strength laterally as not to require the support given by the said angle irons or tie-plates, double angle irons of the above size fitted at the centre line from opening to opening may be substituted.

#### HATCHWAYS AND MAST PARTNERS.

All hatchways and mast holes are to be properly framed to receive half beams where required, and the latter to have mast partners at each tier of beams (except at orlop beams), the plating of which is not to be less in thickness than is required for stringer plates, and the united breadths of the plates are not to be less than three times the diameter of the masts; these plates are to be well riveted to each other, and to the beams, and angle iron carlings; and at the decks where the masts are to be wedged, an angle iron of the dimensions required for the main frame of the ship is to be properly fitted and riveted to the plate round the mast holes. The mast holes, skylights, and companions, must be properly secured to the satisfaction of the Surveyors. Where wood comings are fitted, plates are to be riveted to the beams to which the deck ends are to be fastened.

#### SKYLIGHTS.

The skylights to engine rooms, and the comings to which they are attached, are in all cases to be

substantially constructed, and efficiently fastened to the beams, and, whether of iron or wood, are not to be less than two feet six inches above the upper deck in one or two-decked vessels, and one foot six inches above spar or awning decks. The skylights to be securely attached to the comings, and the glass in them should be very strong, from three-eighths to half an inch thick, protected by a strong guard of iron rods, or by a framework of wire; in addition, deadlights of either iron or wood should be fitted having bull's eyes in them, and arrangements made for their efficient security in bad weather. Strong tarpauling covers are in all cases to be provided. In spar-decked vessels, and those having either a poop, awning deck, or bridge house, with the engine room beneath, the hatchways in the upper deck are to be enclosed by iron trunk bulkheads, not less than five-sixteenths of an inch thick, strengthened by angle iron and extended from the upper deck to the beams above, to which they are to be secured. Strong iron doors will be allowed in these trunk bulkheads, provided their lower parts are at least eighteen inches above the upper deck, and arrangements made for their efficient security.

#### COAL BUNKERS.

Coal bunker pipes, where practicable, are to be formed so as to be at least six inches above the upper deck, fitted with gratings and lids, the latter to have studs to fit in openings made in the pipes for their security, the pipes to be so formed that tarpauling may be securely lashed over them. Where it is necessary to fit flat coal bunker scuttle lids flush with the deck, they must be secured by a bar, or other approved fastening.

#### BUTT STRAPS.

**Section 30.** Butt straps in all cases, except those of floor plates (see Section 13), to be one-sixteenth of an inch thicker than the plates they connect, and to be fitted with the fibre of the iron in the same direction as that of the plates, and riveted as per Section 4.

#### BUTT PLATES OF OUTSIDE PLANKING.

Section 31. The plates to which the butts of the outside planking are to be secured, must be of the breadth of the planks, extending from frame to frame, efficiently riveted thereto, and of the thickness given in Table H; but on the bows and quarters, or wherever else the plank ends may have a tendency to strain off, they are to be one-eighth of an inch thicker than therein prescribed.

#### PLANKING.

Section 32. The material for planking to be in accordance with class in Table I, to be thoroughly seasoned, quite free from sap, wane, or other defects, to be wrought with the heart side to the frames, and with not less than three strakes between the butts, without step butting, and with not less than six-feet shifts; the garboard strakes to be shifted, and of the thickness given in Section 7; the bottom planking is not to be less in thickness than prescribed in Table H, from the garboard strakes up to within a fifth of the depth of hold set down below the upper deck stringer plate; from thence to the planksheer to be in thickness as prescribed in Table H for topsides; or if preferred, the bottom planking may retain its thickness up to within a fourth of the depth of hold set down below the upper deck stringer plate, and from thence to the planksheer be gradually diminished in thickness to that prescribed in Table H for topsides; the thickness of the wood sheerstrakes may be the thickness of the iron sheerstrake they cover less than that prescribed by Table H.

Outside planks (except the garboard strakes) are not to be more than twelve inches broad; they are to be fitted quite close to the frames and plates, and to each other at their inner edges, and wrought with proper seams outside in proportion to their thickness; the hood ends may be reduced one-fifth from the thickness given in Table H at the stem or sternpost, and one-third at the buttock. The caulking edge of the keel seam, and hood end seams of the planking at the stem and sternpost, need not exceed from two and a half inches to four inches, in proportion to the tonnage of the vessel; which can be arranged by trimming the back rabbet from the bearding line to the rabbet line, as required, so as not to unnecessarily reduce the keel, stem, and sternpost. Furrens or pads are in no case to be used.

#### BOLTS.

**Section 33.** The bolts to be not less than the sizes given in Table K; the garboard strakes to be cross-bolted from side to side, with bolts not exceeding four feet six inches apart.

The wood keel to have a vertical bolt through the keel plate between each frame. The stem, stempost, deadwood, and remainder of the keel, to be through fastened in all cases, and the bolts spaced as in the keel.

The screw-pointed bolts for fastening the planking when less than five inches thick, to be of such form under the heads as will prevent them from turning; their heads to be once and three-quarters the diameter of the bolts, and two-fifths their diameter in thickness; the nuts in all cases to be of the same description of metal as the bolts they are applied to, and to be in thickness equal to their diameter, and not to have less substance than three-eighths of the diameter of the bolts in any part, whatever the form may be, hexagon form being preferred.

All outside planks ten inches broad and above, to be double fastened; eight inches and a half and under ten inches, double and single fastened alternately; and under eight and a half inches, single fastened; and all butts to be double fastened.

The bolt holes in the outside planking to be enlarged with a dowelling machine for the bolt heads, which in the bottom up to within one-fifth the depth of hold set down below the upper deck stringer plate, are to be sunk within the surface of the planking one inch and a quarter, when dowels are intended to be used; from thence to the planksheer they need not be sunk more than three-quarters of an inch; the bolts to be properly driven with oakum and white lead, putty, marine glue, or other suitable composition under their heads, and in the bottom they are to be carefully covered (after the seams in the bottom are all caulked) with turned well-seasoned wood dowels, the fibre of which must be in the same direction as the planking, and be driven with white lead, marine glue, or any other approved composition. Where copper or yellow metal bolts are used the sinking of them within the surface of the planking to be optional to the above extent.

#### PLANKING OF TWO THICKNESSES.

Section 34. If the vessel is to be planked with two thicknesses, the whole of the inside thickness must be of material required by Table I for the upper part of the vessel, and the outside thickness, if worked longitudinally, must be of the same material as is prescribed for a vessel constructed with a single thickness of planking, but if the outside thickness is to be worked diagonally, American Rock Elm may be used. If either or both thicknesses be worked longitudinally, or diagonally, each thickness need only be one-half that prescribed in Table H, but thick garboard strakes will be required to be fitted and fastened as

in the case of vessels with a single thickness of planking. When the outside thickness is worked diagonally, a longitudinal strake of plank must be rabbeted into the garboard strake, and the ends of the diagonal planks butted against it; there must also be one or more longitudinal strakes of plank of the materials prescribed in Table I for the upper part of the vessel, fitted above the upper ends of the diagonal planking; and if the topsides be of a single thickness, the upper edge of the said longitudinal planking must be partly let into the topside plank, or be rabbeted into a solid strake, so that it may be efficiently caulked. In all such cases both thicknesses must be caulked, and the outer thickness wrought hot on the best hair felt.

If both thicknesses of plank be worked diagonally, transversely to each other, from keel to gunwale, the bilge and diagonal plates may be dispensed with; but where the thicknesses are otherwise arranged, the bilge and diagonal plates must be fitted as in vessels with single thickness, the diagonal plates may however be extended to ten feet apart on a square with three pairs crossing each other in the centre.

When the inner thickness of plank is wrought diagonally, all the planks must be double fastened to the frames, but when wrought longitudinally, they may be fastened as per Section 33, the bolts in either case must be of the size prescribed in Table K. The outer thickness of plank must be secured to the inner by nut and screw bolts, or else by wrought copper bolts, driven through the inner thickness and clenched inside upon copper or yellow metal rings; a reduction of one-fifth of the diameter from that prescribed in Table K will be allowed when nut and screw bolts are used for fastening the outer thickness of plank, and a reduction of one-third when it is intended to use wrought copper and to clench the bolts of this thickness.

In vessels claiming the additional period for copper or yellow metal bolts, the fastenings in both thicknesses must be of the description and to the height required in those having only one thickness. Where two thicknesses of planking are adopted, dowelling will not be allowed in either thickness.

When the planking is composed of two thicknesses, the outside thickness of planking should not exceed ten inches in breadth, and may be single fastened, but the fastenings are not to exceed twenty inches apart on an edge; if, however, planks are used in the lower part of the bottom more than ten inches but not exceeding twelve inches in breadth, their fastenings are not to exceed eighteen inches apart on an edge.

All iron work, and all iron and wood surfaces which come in contact with each other, are to be properly coated with good paint, or other suitable composition.

#### CAULKING.

Section 35. It is indispensable that the caulking should be well executed, and no material used but the best brown oakum, with tarred spun yarn for the inner thread of bottom. The Surveyors are required to see the caulking thoroughly tested with a beetle and horse, especially in new vessels, and at all surveys when the sheathing is stripped off the bottom.

In vessels with two thicknesses of planking, the condition of the caulking of the outside thickness is to be ascertained, in new vessels, by having a few pieces cut out from the bottom planking so as to expose the oakum; but it will not be necessary to have pieces cut out in vessels with single bottoms, as it can be ascertained whether the oakum is properly driven into the seams by inserting a thin knife into them from within the vessel.

### KNIGHTHEADS, HAWSE TIMBERS, UPPER-DECK WATERWAYS, AND PLANKSHEER.

Section 36. Where the knightheads, hawse timbers, upper-deck waterways, and planksheer are of wood, they must be of materials according to class in Table I, and fastened with bolts as in Table K.

The knightheads and hawse timbers are to be of sufficient siding and moulding, and to have boxing either outside or inside above the upper deck; they are to extend high enough for the efficient security of the bowsprit, and sufficiently below the upper deck to insure strength; to be well bolted, and connected by substantial hooks.

#### WATERWAYS.

Where the roughtree stanchions are of wood the depth and moulding of the upper-deck waterway must be sufficient to give them support; but the depth of the waterway is in no case to be less than three times the thickness of the upper deck, excepting where the planksheer covers it, and it will be required to be well bolted through the sheerstrakes or spirketting plate and upper deck stringer plate.

#### DECKS.

Section 37. The flat of all decks to be of good quality, properly seasoned, free from sap, and objectionable knots, the thickness and fastenings as per Table H.

#### DECK BOLTS.

The upper deck plank to be fastened by screw bolts from the upper side with nuts at the under side of the angle iron of the beams, and to the tie-plates (see Section 29). The bolts must be properly sunk with oakum and white lead under their heads, and be carefully covered over with turned dowels, with the fibre in the same direction as the deck plank, bedded in white lead, marine glue, or other suitable composition.

When the deck planks are six inches in width and under, single fastening will be sufficient; but when they are above six inches and not exceeding eight inches in width, there must be two bolts in each plank in every beam, one of which may be a short screw bolt; and planks exceeding eight inches in width must be double fastened with nut and screw bolts.

If the deck is of teak it may be one-eighth less in thickness than prescribed in Table H.

Upper Decks must be renewed when worn in thickness as follows, viz:—When a deck originally 4 inches thick is worn to 3 inches;  $3\frac{1}{2}$  inches to  $2\frac{3}{4}$  inches; 3 inches to  $2\frac{1}{2}$  inches.

#### CEILING.

Section 38. All vessels to be closely ceiled from the main keelson to the upper part of the bilges, the ceiling to be secured in such a manner as to be easily removed, and from the upper part of the bilges upwards, either close ceiling or batten and space may be adopted, but the latter is considered preferable. It is recommended that the ceiling on the floors should be made in hatches, where practicable, of convenient sizes, so as to be lifted when required for the purpose of survey, or for cleaning and painting. The thickness of the ceiling in the hold from the main keelson to the upper part of the bilges, to be in accordance with Table H, and one-third less in thickness from thence upwards.

#### RUDDER.

Section 39. The main piece of rudder to be of timber, according to class in Table I, of dimensions as per Table H, and the pintles as per Table K. In screw steamers, the size of the main piece of rudder must be increased in diameter not less than one-eighth above the dimensions given in Table H, and the pintles and braces in the same proportion.

#### RUDDER BRACES.

The lower rudder brace is to extend on the bottom planking sufficiently to receive not less than three bolts before the hood ends in addition to the bolts in the sternposts; the remaining braces will not be required to pass the hood ends, but the ends of their arms should be made — shaped, or of other suitable form, so as to receive three through bolts in the sternpost.

#### CHAIN PLATE AND PREVENTER BOLTS.

Section 40. The chain plate and preventer bolts to be of the sizes given in Table K. When the chain and preventer plates are fitted on wood topsides, and the chain and preventer bolts are arranged to pass through below the iron sheerstrake, a plate is to be riveted to the frames, before working the wood topsides, of the same thickness as the sheerstrake, sufficiently wide to take the said bolts, and fillings of wood may be introduced between the frames for the bolts to pass through and be clenched upon plates, or otherwise secured to the satisfaction of the Surveyors.

#### CEMENT.

Section 41. All vessels to be efficiently cemented in the bottom, to the upper part of the bilges, care to be taken to have proper water courses above the cement all fore and aft.

Section 42. The Surveyors in their Reports of vessels for original classification, which have partial deficiences in either the workmanship, materials, or construction, are to state the same for the consideration of the Committee, when such vessels will be liable to have a reduced number of years assigned to them than they would otherwise have been entitled to.

The Surveyors in submitting their Reports of vessels not already classed, are in all cases, where practicable, to forward a Sketch of the Midship Section, and other drawings where necessary, to be furnished by the Builders, with figured dimensions of the component parts marked thereon.

Builders wishing to adopt plans other than those described herein, are to submit them, in the usual manner, through the Resident Surveyors (who are to state their opinions thereon), for the Committee's consideration and approval.

## PERIODICAL SURVEYS DURING CLASSIFICATION.

#### PERIODICAL SURVEYS.

Section 43. All vessels to be surveyed annually if practicable; and whenever the copper, yellow metal, wood, or other sheathing, is stripped off, the condition of the planking, fastenings, and caulking to be ascertained.

Vessels marked C.F. to be subject to a special survey every four years; and those marked G.I.B and I.B. to be subject to a special survey every three years. Such Special Surveys will be noted in the Register Book.

When these Special Surveys are held, the vessel to be placed on blocks of a proper height in a dry dock, or upon ways; if she is sheathed with wood, a sufficient quantity must be removed for the examination of the bolts, caulking, and planking.

At the first Special Survey the limber boards, and ceiling equal to one strake fore and aft on both sides in the hold, below the upper turn of bilge, must be removed.

At subsequent Special Surveys, ceiling equal to an additional strake on both sides in the hold, and one strake on both sides in the tween decks (provided it is close ceiled), must be removed; portions of the cement to be cut out to ascertain its condition, and that of the frames and keel plate; bolts of the bottom and keel, if of iron, to be got out for examination,—the number removed, and their condition, to be stated in the Report of Survey. If the frames, floors, &c., are found to be much oxidized, the whole of the ceiling to be removed and the oxidation cut or beaten off, and the iron work, if necessary, renewed, and the whole then to be properly coated or painted.

### VESSELS NOT SURVEYED WHILE BUILDING.

Section 44. Vessels built in Great Britain, or the British North American Colonies, which have not been surveyed while building, will lose one year of the period to which they might otherwise have been entitled.

When a Character is claimed for such a vessel, she must be placed on high blocks in a dry dock, or on a slip, or other convenient place, so that the keel and bottom may be seen and properly examined. The hold must be cleared, and proper stages made, the outside planking scraped bright from the light water mark to the waterway seam, a sufficient number of fastenings removed from the keel, the planking of the flat of bottom, the bilges, between the light and load line, and from the topsides, in order that their condition may be thoroughly ascertained.

Should the vessel be less than four years old from the date of launching, if close ceiled, a quantity of ceiling equal to one strake fore and aft on each side in the 'tween decks, a like quantity at the upper turn of bilge, and one plank at the lower turn of the bilge on each side over the floors in midships, will be required to be removed, and the limber boards lifted; but should the vessel exceed four years of age, unless she be found in a very clean and satisfactory condition, the whole of the ceiling, or such portion as the Surveyors may require, must be removed, excepting in the case of "batten and space ceiling."

#### WOODEN FLOORS, &c.

Should the vessel however have been constructed with wooden floors, or with iron and wooden frames, and with through fastenings, passing through the ceiling, and she be under four years of age, it will be sufficient if, in lieu of removing the ceiling as above described, a listing be cut out fore and aft on both sides in the 'tween decks 4 inches wide, a ceiling plank at the upper turn of the bilge and at the lower turn of bilge on each side over the floors to be taken out, and the limber boards lifted; but if she exceed four years of age, in addition to the above, a 4-inch listing must be extended fore and aft at the turn of the bilge on each side; and at other parts if considered necessary by the Surveyors.

When the foregoing preparations have been made, a careful survey must be held by two Surveyors (one of them to be an exclusive officer of the Society), who shall submit a report and midship section containing a full description of the vessel, comparing the same with the Rules.

Should a vessel submitted for Classification be sheathed with wood or metal, the same will not be required to be stripped off (if all be found satisfactory to the Surveyors) beyond a sufficient quantity at the keel, hood ends, bilges, and between the light and load water lines, for the purpose of ascertaining the condition of the caulking and the fastenings.

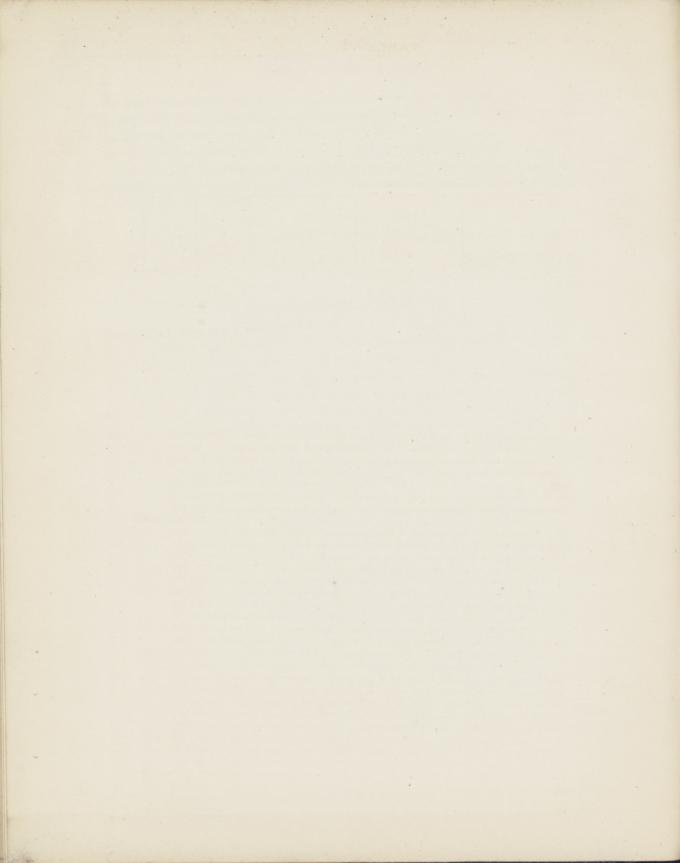
By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, 1st July, 1872.





- WATERCOURSES.—Watercourses are to be formed through an the non plates, on each sa frames, so as to allow water to reach the pumps freely, and also through the vertical cases we have the same of the pumps freely.
- REVERSED FRAMES.—Reversed angle irons on frames to be in size as per Table. All verified to every frame and floor plate, across the middle line, extended to the height of on alternate frames, and to have double reversed angle irons in way of all keelsons and second to the angle iron and upwards, to have reversed angle-iron extended to the upper deck beam stringe decks and spar-decks are constructed, to their deck stringers respectively, except when const they may terminate at the lower part of the curve; and on the remaining frames reversed of the lower deck or hold beam stringer angle-iron, if the vessel has two decks or tiers of deck beam stringer angle-iron, if the vessel has three decks or tiers of beams, the rivets fo and floor plates to be in diameter as specified in Table, and be spaced not to exceed a distant to centre; butts of reversed angle-iron to be secured with butt straps.
- BEAMS.—Beams to be of bulb plate, with double angle-irons on the top edge, or of T bulb iron, or The upper deck beams to be one quarter of an inch in depth to every foot in length of sixteenth of an inch for every inch in depth, with one-sixteenth of an inch added; if of be not less than three-fourths the depth of the beam, and where beams are formed of bull the flanges of each of the angle-irons are not to be less in their united breadth than one-sixteenth of an inch in thickness for every inch of the two sides of the angle-irons-eighth of the depth deeper, and one-sixteenth of an inch thicker than the upper deck with the frames by bracket ends, or knee plates, the arms of each to be not less than twice and of not less thickness than the beams. All beams for at least three-quarters the length beams under the bowsprit, pall bit, windlass and capstan are to be pillared; the pillars ends, so as to form a continuous tie from the keelson to the upper deck, or spar-deck, and to
- IRON SHEERSTRAKE.—The iron sheerstrake to be one inch in breadth for every six feet of the and to be of the thickness given in Table; it may then be gradually reduced in breadth a breadth and thickness at her ends. The butts of the iron sheerstrake in all cases to be she the beam ends, the shift in no case to be less than equal to three spaces of frames, and all feet long, but if the sheerstrake plates are eighteen feet long they may be of two equal butts of all plating to be fitted quite close, and in no case is the lower edge of the iron she breadth required by the Rule for sheerstrake below the upper deck stringer plate. The but fitted outside or inside, and in no case to be in two pieces by being cut at the stringer plate.

	Топпаде.	Main Piece of Rudder, from trom Lower Part of	Windlass.	Thickness to Wood of Meding in	Upper Deck,	from the	From the branch and the branch and the drift and the branch and the branch and the branch and the drift and the drift and the branch and the
Ó	NAGE -	n flush-decl		one, may en	three decks.	obistuO to	

e mark, or his name and the place where made.

STERN POSTS, FLOOR PLATES, BEAMS, STRINGERS, &c.



COMPOSITE SHIPS.—TABLE OF MINIMUM DIMENSIONS OF FRAMES, PLANKING, KEELS, KEELSONS, STEMS, STERN POSTS, FLOOR PLATES, BEAMS, STRINGERS, &c.

All plates, and all beam and angle iron, used in ships intended for classification, are to be stamped legibly in two places with the manufacturer's trade mark, or his name and the place where made.

i local	igili of the	51 911 - HIL	e, for sirro-	EEEET9BEE DO	f odd lo da	blood out of	3-1-01, 0500	in ships intended for	classificatio	n, are to be	stamped leg	gibly in two places w	ith the man	ufacturer's t	rade mark,	or his name a	and the place	where mad	s, BEAL	AS, STR	INGERS	, &c.
1	Tonnage.  'ee Notes to Table.	Distance of Frames from Moulding Edge to Moulding Edge all Fore and Aft.	Siding of Keel, Stem, and Stern Post, and Moulding of Stem.	of	Kee Flat Pla Thicknes Plate Kee standing	nd Thickness of 1 Plate, te Keelson, and ss of Single Vertical elson, upon Floors.  Thickness.	Dimensions of Angle Iron for Frames, and the Lower Angle Irons of	Dimensions of Angle Iron for Reversed Frames,	Thickness of Centre Plate Keelson, Sheerstrake, (where not planked over also of Butt Plates for Planking in Midships.	A COSIL	Thickness of Stringer Plates upon Beam Ends Tie Plates o Beams, She strake (wher planked over and Topside Plating (where not planked over Bilge Strake and Diagona Plates on Frames, and Middle Line Intercostal Keelsons.	Dimensions of Angle Iron on Beam Stringers, Stringers in Hold, and Keelsons.	Diamet	er of Solid	From the Garboard Strake up to within one-fifth of the Depth of Hold seddown below	Topsides from the Planksheer to within one-fifth of the Depth tof Hold set down below the Upper Deck	Thickness of Upper Deck, and Planksheer.	Thickness of Wood	Win See Notes  Diameter of Iron	of Main	Main Piece of Rudder, from Lower Part of Counter upwards, Pall Bitt, and Wood Keelson, Sided and Moulded.	
dibir	Tons.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	side stay from more				Stringer.	Tably Store	ge, emoisuoud uut tara dra	Spindle.	Piece.	Date intone	Tons.
8	$\frac{100}{100}$	18	$9\frac{1}{2}$	11	19	8 16	$2\frac{3}{4} \times 2\frac{3}{4} \times \frac{5}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$	6 16	5 16	$\frac{5}{16}$	$3 \times 3 \times \frac{5}{16}$	inches.	inches.	inches.	inches. $2\frac{1}{2}$	inches. $2\frac{3}{4}$	inches. $1\frac{1}{2}$	inches. $2\frac{1}{4}$	inches. $12\frac{1}{2}$	inches. $9\frac{1}{2}$	50 and under
8	nd under 200	18	10½	12	21	9	$2\frac{3}{4} \times 2\frac{3}{4} \times \frac{6}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	$\frac{7}{16}$	$\frac{5}{16}$	$\frac{6}{16}$	$3 \times 3 \times \frac{6}{16}$	$2\frac{1}{2}$	21/4	4	3	3	$1\frac{1}{2}$	$2\frac{1}{2}$	14	11	$\frac{100}{100}$ and under
a	200 nd under 300	18	$11\frac{1}{2}$	13	23	10	$3\times3\times_{\frac{6}{16}}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	8 16	$\frac{6}{16}$	7 16	$3 \times 3 \times \frac{6}{16}$	$2\frac{3}{4}$	$\frac{2\frac{3}{8}}{2\frac{3}{8}}$	$4\frac{1}{2}$	$\frac{31}{2}$	$\frac{31}{4}$	$\frac{1\frac{3}{4}}{1}$	$\frac{2}{2\frac{3}{4}}$	15	12	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
a	300 nd under 400	18	$12\frac{1}{2}$	14	25	10	$3\times3\times_{\frac{6}{16}}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	9 16	7 16	8 16	$3 \times 3\frac{1}{2} \times \frac{6}{16}$	$2\frac{7}{8}$	$2\frac{3}{8}$	$4\frac{1}{2}$	31/2	31/2	2	3	16	13	$\frac{300}{300}$ and under
end o	400 ad under 500	18	13	$14\frac{1}{2}$	26	11/6	$3\frac{1}{4} \times 3\frac{1}{2} \times \frac{7}{16}$	$2\frac{1}{2} \times 2\frac{3}{4} \times \frac{6}{16}$	9 16	7 16	8 16	$3 \times 4 \times \frac{6}{16}$	3	$2\frac{1}{2}$	5	4	31/2	$2\frac{1}{4}$	$3\frac{1}{4}$	17	14	$\begin{array}{ c c c }\hline 400 \\\hline 400 \\\hline \text{and under} \\\hline \end{array}$
aı	500 ad under 600	18	$13\frac{1}{2}$	15	27	116	$3\frac{1}{4} \times 3\frac{1}{2} \times \frac{7}{16}$	$2\frac{1}{2} \times 3 \times \frac{6}{16}$	10	8 16	$\frac{9}{16}$	$3\frac{1}{2} \times 4 \times \frac{7}{16}$	31/8	$2\frac{1}{2}$	5	4	$\frac{3\frac{3}{4}}{3\frac{3}{4}}$	$2\frac{1}{2}$	$3\frac{1}{2}$	18	$14\frac{3}{4}$	$\frac{500}{500}$ and under
	600 id under 700	18	14	$15\frac{1}{2}$	28	$\frac{12}{16}$	$3\frac{1}{2}\times4\times\frac{8}{16}$	$2\frac{3}{4} \times 3 \times \frac{6}{16}$	$\frac{1}{1}\frac{0}{6}$	8 16	9 16	$\frac{3\frac{1}{2}\times4\frac{1}{2}\times\frac{7}{16}}$	31/4	$\frac{1}{2\frac{1}{2}}$	$5\frac{1}{2}$	$-\frac{1}{4\frac{1}{2}}$	$3\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{5}{8}$	19	$-\frac{15\frac{1}{2}}{}$	$\frac{600}{600}$ and under
an	700 d under 800	18	$14\frac{1}{2}$	16	29	$\frac{12}{6}$	$3\frac{1}{2}\times4\times\frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	11 16	9 16	10 16	$4 \times 4\frac{1}{2} \times \frac{8}{16}$	33/8	$-\frac{1}{2\frac{1}{2}}$	$5\frac{1}{2}$	$4\frac{1}{2}$	4	$2\frac{3}{4}$	$3\frac{3}{4}$	20	16	700 700 and under
an	800 d under 900	18	15	$16\frac{1}{2}$	30	$\frac{13}{16}$	$3\frac{3}{4} \times 4\frac{1}{2} \times \frac{9}{16}$	$3 \times 3 \times \frac{7}{16}$	11/16	$\frac{9}{16}$	10	$4 \times 5 \times \frac{8}{16}$	$3\frac{1}{2}$	$-\frac{1}{2\frac{1}{2}}$	6	$\frac{4\frac{3}{4}}{4}$	4	$\frac{2\frac{3}{4}}{}$	4	21	$16\frac{1}{4}$	$\frac{800}{800}$ and under
an	900 d under 1000	18	$15\frac{1}{2}$	17	31	13	$3\frac{3}{4} \times 4\frac{1}{2} \times \frac{9}{16}$	$3 \times 3\frac{1}{4} \times \frac{7}{16}$	$\frac{12}{16}$	10	11	$4 \times 5 \times \frac{9}{16}$	31/2	$\frac{25}{8}$	6	$\frac{1}{4\frac{3}{4}}$	4	$\frac{2\frac{3}{4}}{2}$	$4\frac{1}{4}$	22	16½	900 900 and under
an	000 d under 1200	18	16	$17\frac{1}{2}$	32	$\frac{14}{16}$	$3\frac{3}{4} \times 4\frac{3}{4} \times \frac{9}{16}$	$3 \times 3\frac{1}{2} \times \frac{8}{16}$	12	10	11/16	$4\frac{1}{2} \times 5 \times \frac{9}{16}$	31/2	$2\frac{5}{8}$	$6\frac{1}{4}$	5	4	3	$4\frac{1}{2}$	23	$\frac{16\frac{3}{4}}{1}$	$\frac{1000}{1000}$ and under
1 and	200 l	18	$16\frac{1}{2}$	18	33	$\begin{array}{c c} 14 \\ \hline 16 \end{array}$	$3\frac{3}{4} \times 4\frac{3}{4} \times \frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	13 16	11 16	1 2 1 6	$4\frac{1}{2} \times 5\frac{1}{2} \times \frac{9}{16}$	3 <u>5</u>	$2\frac{5}{8}$	61/4	5	4	3	$\frac{45}{8}$	24	17	1200 1200 and under
l an	500 500 d under 2000	18	17	18½	34	$\begin{array}{c c} 15 \\ \hline 16 \end{array} \qquad \boxed{4}$	$4 \times 5 \times \frac{10}{16}$	$3\frac{1}{2}\times4\times\frac{9}{16}$	13	11 16	12 16	$5 \times 6 \times \frac{9}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	61/2	$5\frac{1}{4}$	4	3	45/8	$25\frac{1}{2}$	$17\frac{1}{2}$	1500 1500 and under
an	2000 2000 d under 2500	18	$17\frac{1}{4}$	19	$34\frac{1}{2}$	$\frac{15}{16}$	$4 \times 5\frac{1}{2} \times \frac{10}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	14/16	12 16	$\frac{13}{16}$	$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	7	$5\frac{3}{4}$	4	3	$4\frac{3}{4}$	27	18	2000 2000 and under 2500
aı	2500 2500 ad under 3000	18	$17\frac{1}{4}$	191/4	$34\frac{1}{2}$	15	$4 \times 6 \times \frac{11}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	$\frac{14}{16}$	1 2 1 6	13	$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	33/4	$2\frac{3}{4}$	$7\frac{1}{2}$	6	4	3	434	$28\frac{1}{2}$	19	2500 2500 and under 3000
a	3000 nd under 3500	18	$17\frac{1}{2}$	19½	35	16	$4 \times 6\frac{1}{2} \times \frac{11}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	1516	1216	13 16	$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	8	6	4	3	5	30	20	3000 and under 3500

Mem.—The scantlings given in the above Table are intended for Ships the length of which, measured from the Stern-post on the range of the Upper Deck, does not exceed seven times their moulded breadth or ten times their depth of Hold, taken from the upper part of Floors to the top of the Upper Deck Beams. For Ships which exceed these proportions, the plans to be submitted for the Committee's consideration.

The depth for defining the proportions of spar decked vessels, is to be measured from the top of the floor plates to the upper side of the middle or tonnage deck beams.

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Hali	RIVETS.  Diameter of Rivets required for Thickness of Plates	of an Inch.  5 16 6 16 7 16	$ \begin{array}{c c} \frac{3}{4}, \\ \text{of an In} \\ \hline \\ \frac{8}{16} & \frac{9}{16} \end{array} $	10 16	11116	78 of an Inch.	13/16	14/16	1 Inch.	$\frac{16}{16}$	Diameter of Nut and Screw Bolts for Fastening Flat of Deck.  3 ins. and under 3½ ins ½ inch  3½ ,, ,, 4 ,, ½ ; ,,  4 inches 5 ; ,,

- TONNAGE.—In flush-decked vessels having either one, two, or three decks (not being spar or awning-decked), the tonnage under the upper deck, without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels, is to regulate all the scantlings of the hull, and also the equipment of the vessel. In vessels having a raised quarter deck, or a poop, or top-gallant forecastle, or deck houses, or awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull, but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, with the addition of the tonnage of the space required for propelling power, is to regulate the equipment, and also the size of the main piece of rudder and windlass, and the keel and keelsons and their number, and the scantling of the stringer plates on the upper and lower deck beams, and the requirements as to double rivetting. But in vessels where the tonnage of the erections above the tonnage deck is less than that required for crew space, then the difference between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment and the size of the main piece of rudder and windlass, and the keel and keelsons and their number, the scantling of the stringer plates on the upper and lower deck beams, and the requirements for double rivetting.
- WOOD KEEL, Stem, and Stern Post to be of the dimensions specified in Table.
- KEEL PLATE.—The keel plate to be of the breadth and thickness prescribed in Table H, to be made continuous up the apron and up the inner stern-post as high as practicable, but in all cases to extend above the lower deck or hold beam stringer angle iron. Forward and aft the plate is to be curved to the form of the bearding line, and to be one-sixteenth of an inch thicker than prescribed in the Table, where it passes over the deadwoods, apron, and inner stern-post, and to be sided as required by the form of the vessel, to have an angle iron of the size given in Table for stringer angle irons rivetted on each edge, flanged to the form of the vessel to receive the plank fastenings. The keel plate to maintain its breadth for three-fifths the length of the keel in midships, and then to be gradually reduced until its edges conform with the flange of the angle iron on the keel plate forward and aft; the butts of the keel plates to be shifted clear of the keel
- FRAMES.—The frames to be of the dimensions as set forth in Table, and the narrow flange to be of a parallel thickness, that the nuts of the screw bolts may fit closely. The frames to be in as long lengths as possible, fitted and rivetted on to the keel plate, and extended as near to the middle line as practicable, according to the plan of construction adopted, and in all cases to extend to the gunwale, and where raised quarter decks, poops, forecastles and spar decks are constructed, to their deck stringers respectively, except when constructed with a rounded form at the gunwale, then they may terminate at the lower part of the curve; if the frames be welded, the welds to be perfect with not less than four feet shifts from the welds of next frames, or if butted to have not less than four feet shifts with four feet lengths of angle iron of the same size as the frame, fitted back to back rivetted to them, and secured to the outside planking. The spacing of the frames (where one thickness of planking in the bottom is intended) not to exceed 18 inches from moulding edge to moulding edge all fore and aft, a four feet length of angle iron, the size of the frame, is to be rivetted to each floor and to the keel plate, back to back with the frames
- FLOOR PLATES.—The floor plates to be in thickness according to Table, but at each end of the vessel for one quarter of her length they may be reduced in thickness one-sixteenth of an inch where the midship floor plates are six-sixteenths and under ten-sixteenths of an inch, and two-sixteenths of an inch where the plates are ten-sixteenths and above in thickness. The floor plates to be in depth at middle line according to the following rule, viz., to the vessel's depth, measured from the top of the keel to the top of the upper or spar-decked beams amidships add the extreme breadth of the vessel, two-fifths of that sum in inches to be the depth of the floor plates at the middle line well fore and aft, but at the extreme fore and after ends, they must be deeper, so as to form an efficient connection between the two sides of the vessel. The floor plates are to extend up the bilges not less than to a perpendicular height of twice and a half the depth of floors amidships, from upper side of keel at middle line; and in no case to be less moulded in any part, than a fair taper between the depth at middle line, and the moulding at their extreme ends, which is to be not less than the moulding of the frames. The ends of the floors to maintain the height prescribed amidships, for one quarter of the vessel's length, they may then be gradually lowered forward and aft until the upper edges of the floor plates are level, which place is to be determined by the form of the vessel, and from that point to the vessel's ends they are to be gradually increased in depth, so as to efficiently connect the sides of the vessel; the upper parts of the floors forward and aft are to be high enough to give ample room between the reverse frames on each side of the vessel, for fitting the keelson angle irons. In vessels having considerable rise of floor, the depth of the floor plates, on a square, at the quarter of the vessel's extreme moulded breadth, set out from the middle line, is to be not less than three-fifths the depth of the floor plate, at the middle line, and the floor plate is to be extended up the bilges, by a fair taper from middle line, until it terminates at the moulding of the frames. A floor plate to be fitted and rivetted to every frame, and to be extended across the middle line; but where a vertical centre plate is adopted at middle line, then the floor plates are to be efficiently connected to it on each side by double vertical angle irons of not less size than the reversed frames. When floors extend from side to side and are made in two lengths, the butts are to have double butt straps, one on each side of the floor plates, and three-fourths the thickness of the floor plates, or else the floor plates must be lapped and treble rivetted.
- WATERCOURSES .- Watercourses are to be formed through all the floor plates, on each side of the middle line and at the bilges above the frames, so as to allow water to reach the pumps freely, and also through the vertical entre plate, and intercostal keelsons when such keelsons are adopted.
- REVERSED FRAMES.—Reversed angle irons on frames to be in size as per Table. All vessels under 200 tons to have reversed angle-iron rivetted to every frame and floor plate, across the middle line, extended to the height of the upper part of the bilge, and to the gunwale on alternate frames, and to have double reversed angle irons in way of all keelsons and stringers in hold; and in addition, all vessels of 200 tons and upwards, to have reversed angle-iron extended to the upper deck beam stringer on alternate frames, and where raised quarter decks and spar-decks are constructed, to their deck stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; and on the remaining frames reversed angle-irons are to be fitted to above the height of the lower deck or hold beam stringer angle-iron, if the vessel has two decks or tiers of beams, and to above the height of the middle deck beam stringer angle-iron, if the vessel has three decks or tiers of beams, the rivets for securing the reversed angle-iron to the frames and floor plates to be in diameter as specified in Table, and be spaced not to exceed a distance of nine times their own diameter from centre to centre; butts of reversed angle-iron to be secured with butt straps.
- BEAMS .- Beams to be of bulb plate, with double angle-irons on the top edge, or of T bulb iron, or of any other approved form of equal strength. The upper deck beams to be one quarter of an inch in depth to every foot in length of the midship beam, and to be in thickness onesixteenth of an inch for every inch in depth, with one-sixteenth of an inch added; if of T bulb the united breadth of the top flanges to be not less than three-fourths the depth of the beam, and where beams are formed of bulb plate with double angle-irons on the top edge, the flanges of each of the angle-irons are not to be less in their united breadth than three-fourths the depth of the beam, and to be one-sixteenth of an inch in thickness for every inch of the two sides of the angle-iron. Middle deck, hold, and orlop beams, to be one-eighth of the depth deeper, and one-sixteenth of an inch thicker than the upper deck beams. All beams to be efficiently connected with the frames by bracket ends, or knee plates, the arms of each to be not less than twice-and-a-half the depth of the beams in length, and of not less thickness than the beams. All beams for at least three-quarters the length of the vessel in midships, and in addition the beams under the bowsprit, pall bit, windlass and capstan are to be pillared; the pillars to have not less than two rivets in each of their nds, so as to form a continuous tie from the keelson to the upper deck, or spar-deck, and to be of the sizes given in Table.
- IRON SHEERSTRAKE .- The iron sheerstrake to be one inch in breadth for every six feet of the vessel's length, for half her length in midships, and to be of the thickness given in Table; it may then be gradually reduced in breadth and in thickness to three-fourths of the midship breadth and thickness at her ends. The butts of the iron sheerstrake in all cases to be shifted clear of the butts of the stringer plates on the beam ends, the shift in no case to be less than equal to three spaces of frames, and all plates where practicable to be not less than nine feet long, but if the sheerstrake plates are eighteen feet long they may be of two equal breadths, but carvel plated and single rivetted; butts of all plating to be fitted quite close, and in no case is the lower edge of the iron sheerstrake to be fitted less than two-thirds of the breadth required by the Rule for sheerstrake below the upper deck stringer plate. The butt straps in all cases to be in one piece, whether fitted outside or inside, and in no case to be in two pieces by being cut at the stringer plate. See Section 30.

- IRON BILGE STRAKE.—The bilge strake plates to be two-thirds the breadth of the iron sheerstrake, for three-fifths the length of the keel in midships, and from thence to the ends of the vessel they are to be reduced gradually to one-half their midship breadth; the thickness of the plates to be as prescribed in Table H, and they are to be fitted at the bilges with the middle of the plate at the height prescribed for floorheads, such position for the bilge plates to be maintained, notwithstanding that the floorheads may be carried higher. They are to be extended to the ends of the vessel in accordance with her form, and properly rivetted to the frame.
- DIAGONAL PLATES ON FRAMES.—The diagonal plates on the frames to be not less than one-third the breadth of the iron sheerstrake, and fitted in pairs, transversely, all fore and aft, at an angle of 45°, with the butts of each pair meeting between the frames; to be of the thickness given in Table, and connected to the sheer and bilge strake plates, by butt straps double rivetted, and to be efficiently rivetted to each other, and to each frame they cross.
- STRINGER PLATES .- All vessels to have stringer plates of the thickness given in Table upon the ends of each tier of beams. Those upon the ends of the upper deck beams of one, two, and three decked vessels to be in width one inch for every seven feet of the vessel's entire length for half her length in midships, and from thence to the ends of the vessel they may be gradually reduced to three-fourths the width in midships; in no case however is the width in midships to be less than eighteen inches. The stringer plates are to be rivetted to the beams and properly shifted, fitted home, and rivetted to the iron sheerstrake, with an angle iron of the dimensions given in Table, and the roughtree stanchions are not to pass through them. Stringer plates on the ends of beams below the upper deck may be reduced in width to three-fourths the midship breadth of the upper deck stringer, which breadth is to extend all fore and aft, and to have an angle iron of the dimensions given in Table, extending all fore and aft, rivetted to reverse angle iron on each frame and to the stringer plates. In cases where a deck is not laid, and the width of the stringer plate on ends of hold beams is objected to, it may be reduced in width, provided such reduction be fully compensated for. All stringer angle irons are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron or plate iron not less than two feet long, fitted in the throat of them, properly rivetted to each flange, and the thickness of the connecting plates not to be less than the angle iron they cover. Upper deck gutter waterways are to be flooded to ascertain if there be any leakage, and when completed they are to be properly cemented.
- TIE PLATES.—All vessels are to have tie plates ranging all fore and aft upon each side of the hatchways on each tier of beams, and in addition thereto the beams of the upper and middle decks in three decked or spar decked vessels, and of the upper deck in vessels of one or two decks must have tie plates fitted from side to side diagonally, in number one pair for about every 35 feet of the vessel's length; these plates in both cases must not be less in width than once and a half the depth of the beams of their respective decks, and of the thickness required for stringer plates; they are to be well rivetted to each other and to the beams and stringers, and to have intermediate fastenings into the deck plank between the beams, in all cases their butts to be chain rivetted. Upon hold beams where a deck is not to be laid, a tie formed of double angle irons of the size given for the main frames of the ship may be fitted each side of the hatchways in lieu of tie plates, but if the beams are made of such additional strength laterally as not to require the support given by the said angle irons or tie plates, double angle irons of the above size fitted at the centre line, from opening to opening, may be substituted. All hatchways and mast holes are to be properly framed to receive half beams where required, and the latter to have mast partners at each tier of beams (except at orlop beams), the plating of which is not to be less in thickness than is required for stringer plates, and the united breadths of the plates are not to be less than three times the diameter of the masts; these plates to be well rivetted to each other, and to the beams, and angle iron carlings, and at the decks where the masts are to be wedged, an angle iron of the dimensions required for the main frame of the ship is to be properly fitted and rivetted to the plate round the mast hole. The mast holes, skylights, and companions must be properly secured to the satisfaction of the Surveyors. Where wood comings are fitted, plates are to be rivetted to the beams to which the deck ends are to be fastened.
- BUTT STRAPS.—Butt straps in all cases, except those of floor plates (see Section 13) to be one-sixteenth of an inch thicker than the plates they connect, and to be fitted with the fibre of the iron in the same direction as that of the plates, and rivetted as per Section 4.
- BUTT PLATES OF OUTSIDE PLANKING.—The plates to which the butts of the outside planking are to be secured, must be of the breadth of the planks, and extend from frame to frame, efficiently rivetted thereto, and of the thickness given in Table, but on the bows and quarters or wherever else the plank ends may have a tendency to strain off, they are to be one-eighth of an inch thicker than therein prescribed.
- RIVETS AND RIVETTING .- The rivets to be of the best quality, and to be of the diameter as per Table, the rivet holes to be regularly and equally spaced, and carefully punched opposite each other in the adjoining parts, from the faying surfaces in the laps, lining pieces, butt straps, and frames, and to be countersunk where required, the rivets not to be nearer to the butts or edges of the plating, lining pieces to butts, or of any angle iron, than a space equal to their own diameter, and not to be further apart from centre to centre than five times their diameter, or nearer than four times their diameter from centre to centre, and to be spaced through the frames and outside plating, and in reversed angle iron a distance equal to nine times their diameter from centre to centre. All butts of iron plating, excepting those of poops and top-gallant forecastles, to be at least double rivetted, and a space equal to twice the diameter of the rivets to be between each row; where treble rivetting is adopted, a space equal to twice the diameter of the rivet to be between each row, with half the number of rivets
- GARBOARD STRAKES.—The garboard strakes not to be less than two-thirds the depth of the keel prescribed in Table, and properly rabbetted into it, to be fitted closely to the iron keel plate, and to be of sufficient width. The butts of the garboard strakes to have not less than four feet six inches shift from the butts of the garboard strake on the opposite side of the vessel, nor less than the same shift clear of the keel scarph. For bolting, see Section 33.
- PLANKING.—The planking to be thoroughly seasoned, quite free from sap, wane, or other defects, to be wrought with the heart side to the frames, and with not less than three strakes between the butts, without step butting, and with not less than six feet shifts; the garboard strakes to be shifted and of the thickness given in Section 7; the bottom planking is not to be less in thickness than prescribed in Table, from the garboard strakes up to within a fifth of the depth of hold set down below the upper deck stringer plate, from thence to the planksheer to be in thickness as prescribed in Table for topsides; or, if preferred, the bottom planking may retain its thickness up to within a fourth of the depth of the hold set down below the upper deck stringer plate, and from thence to the planksheer be gradually diminished in thickness to that prescribed in Table for topsides; the thickness of the wood sheerstrakes may be the thickness of the iron sheerstrake they cover less than that prescribed by Table. Outside planks (except the garboard strakes) are not to be more than twelve inches broad; they are to be fitted quite close to the frames and plates, and to each other at their inner edges, and wrought with proper seams outside in proportion to their thickness; the hood-ends may be reduced one-fifth from the thickness given in Table, at the stem or stern-post, and one-third at the buttock. The caulking edge of the keel seam, and hood-end seams of the planking at the stem and stern-post, need not exceed from two and a half inches to four inches, in proportion to the tonnage of the vessel; which can be arranged by trimming the back rabbet from the bearding line as required, so as not to unnecessarily reduce the keel, stem, and stern-post. Furrens or pads are in no case to be used.
- DECKS.—The flat of all decks to be of good quality, properly seasoned, free from sap and objectionable knots, the thickness and fastenings as per Table. The upper deck plank to be fastened by screw bolts from the upper side with nuts at the under side of the angle irons of the beams and to the tie plates, see Section 29. The bolts must be properly sunk, with oakum and white lead under their heads, and be carefully covered over with turned dowels, their fibre in the same direction as the deck plank, and bedded in white lead, marine glue, or other suitable composition. When the deck planks are six inches in width and under, single fastening will be sufficient; but when they are above six inches and not exceeding eight inches in width, there must be two bolts in each plank in every beam, one of which may be a short screw bolt; and planks exceeding eight inches in width must be double fastened with nut and screw bolts. If the deck is of Teak it may be one-eighth less in thickness than prescribed in the Table. Upper decks must be renewed when worn in thickness as follows, viz.:-When a deck originally 4 inches thick is worn to 3 inches;  $3\frac{1}{2}$  inches to  $2\frac{3}{4}$  inches; 3 inches to  $2\frac{1}{2}$  inches.
- CEMENT.—All vessels to be efficiently cemented in the bottom to the upper part of the bilges, care to be taken to have proper water courses above the cement all fore and aft.
- WINDLASS .- The diameter of main piece of windlasses in Steam Ships may be seven-eighths of that required in the Table, provided always the body of the windlass be not of unusual length.

ke plates to be two-thirds the breadth of the iron sheerstrake, for three-fifths the length of the keel in ds of the vessel they are to be reduced gradually to one-half their midship breadth; the thickness of le H, and they are to be fitted at the bilges with the middle of the plate at the height prescribed for the plates to be maintained, notwithstanding that the floorheads may be carried higher. They are to be a accordance with her form, and properly rivetted to the frame.

The diagonal plates on the frames to be not less than one-third the breadth of the iron sheerstrake, and and aft, at an angle of 45°, with the butts of each pair meeting between the frames; to be of the cted to the sheer and bilge strake plates, by butt straps double rivetted, and to be efficiently rivetted to cross.

re stringer plates of the thickness given in Table upon the ends of each tier of beams. Those upon the e, two, and three decked vessels to be in width one inch for every seven feet of the vessel's entire length d from thence to the ends of the vessel they may be gradually reduced to three-fourths the width in e width in midships to be less than eighteen inches. The stringer plates are to be rivetted to the beams and rivetted to the iron sheerstrake, with an angle iron of the dimensions given in Table, and the through them. Stringer plates on the ends of beams below the upper deck may be reduced in width to f the upper deck stringer, which breadth is to extend all fore and aft, and to have an angle iron of the ig all fore and aft, rivetted to reverse angle iron on each frame and to the stringer plates. In cases dth of the stringer plate on ends of hold beams is objected to, it may be reduced in width, provided such

All stringer angle irons are to be in as long lengths as possible, properly shifted, and wherever butted late iron not less than two feet long, fitted in the throat of them, properly rivetted to each flange, and tes not to be less than the angle iron they cover. Upper deck gutter waterways are to be flooded to ad when completed they are to be properly cemented.

plates ranging all fore and aft upon each side of the hatchways on each tier of beams, and in addition l middle decks in three decked or spar decked vessels, and of the upper deck in vessels of one or two m side to side diagonally, in number one pair for about every 35 feet of the vessel's length; these plates dth than once and a half the depth of the beams of their respective decks, and of the thickness required vell rivetted to each other and to the beams and stringers, and to have intermediate fastenings into the Il cases their butts to be chain rivetted. Upon hold beams where a deck is not to be laid, a tie size given for the main frames of the ship may be fitted each side of the hatchways in lieu of tie plates, additional strength laterally as not to require the support given by the said angle irons or tie plates, ze fitted at the centre line, from opening to opening, may be substituted. All hatchways and med to receive half beams where required, and the latter to have mast partners at each tier of beams of which is not to be less in thickness than is required for stringer plates, and the united breadths of ree times the diameter of the masts; these plates to be well rivetted to each other, and to the beams, and s where the masts are to be wedged, an angle iron of the dimensions required for the main frame of the tted to the plate round the mast hole. The mast holes, skylights, and companions must be properly urveyors. Where wood comings are fitted, plates are to be rivetted to the beams to which the deck ends

, except those of floor plates (see Section 13) to be one-sixteenth of an inch thicker than the plates they bre of the iron in the same direction as that of the plates, and rivetted as per Section 4.

CING.—The plates to which the butts of the outside planking are to be secured, must be of the breadth me to frame, efficiently rivetted thereto, and of the thickness given in Table, but on the bows and ends may have a tendency to strain off, they are to be one-eighth of an inch thicker than therein prescribed. Its to be of the best quality, and to be of the diameter as per Table, the rivet holes to be regularly and ned opposite each other in the adjoining parts, from the faying surfaces in the laps, lining pieces, buttersunk where required, the rivets not to be nearer to the butts or edges of the plating, lining pieces to space equal to their own diameter, and not to be further apart from centre to centre than five times their their diameter from centre to centre, and to be spaced through the frames and outside plating, and in I to nine times their diameter from centre to centre. All butts of iron plating, excepting those of poops least double rivetted, and a space equal to twice the diameter of the rivets to be between each row, space equal to twice the diameter of the rivets to be between each row, with half the number of rivets

ABIGUARA PARA PARA PARA PARA PARA PARA PARA	Deadwood Keel† Stem* and Stern Post Bolts.	Keel, and	Topside, Waterway, and Planksheer Bolts.	Chain Plate Bolts.	Pintles of Rudder.	Sternp Sternp Sternp Aprol  Sternp  REEL  Regular  KREEL  Knighth
and under 100	M 7 19dm	10	16 blo	H 13	alee 2 -mi	50 and under 100
100 and under 200	1 41	10	$\frac{9}{16}$	7 8	$2\frac{1}{4}$	100 and under 200
20() and under 300	$1\frac{1}{16}$	$\frac{12}{16}$	$\frac{10}{16}$	1	$2\frac{1}{2}$	200 and under 300
300 and under 400	116	12 16	10	$1\frac{1}{8}$	$212\frac{3}{4}$	300 and under 400
400 and under 500	1 1 6	$\frac{13}{16}$	$\frac{11}{16}$	$1\frac{1}{8}$	3	400 and under 500
500 and under 600	$1\frac{1}{8}$	13 16	11/16	$1\frac{1}{8}$	$3\frac{1}{8}$	500 and under 600
600 and under 700	11801	14 16 01	$\frac{12}{16}$ S	$1\frac{1}{4}$	8 31/4	600 and under 700
700 and under 800	$1\frac{1}{8}$	14	$\frac{12}{16}$	$1\frac{1}{4}$	$3\frac{1}{2}$	700 and under 800
800 and under 900	$1\frac{3}{16}$	15	13	14	$8 \ 3\frac{1}{2}$	800 and under 900
900 and under 1000	$1\frac{3}{16}$	15	13	$1\frac{3}{8}$	$3\frac{5}{8}$	900 and under 1000
1000 and under 1200	11/4	1	14 16	$1\frac{3}{8}$	$3\frac{5}{8}$	1000 and under 1200
1200 and under 1500	$1\frac{5}{16}$	1 0	$\frac{1}{1}\frac{4}{6}$	$1\frac{3}{8}$	$8 \ 3\frac{3}{4}$	1200 and under 1500
1500 and under 2000	$1\frac{6}{16}$	$1\frac{1}{16}$	15 16	$1\frac{1}{2}$	$3\frac{7}{8}$	1500 and under 2000
2000 and under 2500	$1\frac{7}{16}$	$1\frac{2}{16}$	1	$1\frac{1}{2}$	4	2000 and under 2500
2500 and under 3000	$1\frac{8}{16}$	$1\frac{2}{16}$	1	15/8	41/8	2500 and under 3000
3000 and under 3500	$1\frac{8}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$1\frac{3}{4}$	$4\frac{1}{8}$	3000 and under 3500

Tonsunder		200	500 and under 1000	1000 and under 2000	2000 and under 3000
* Number of Bolts in Scarphs of Keels.	ngle Irona, om in 6 hips	lates and A flat of bott	8	en the end in	10

The length of the keel scarphs to be five times the mean of the siding and moulding of the keel,

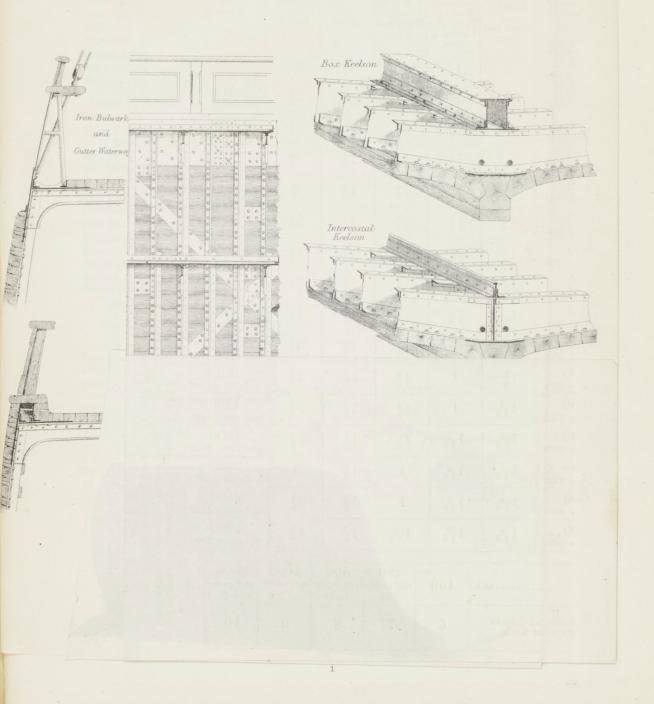
33.-The bolts to be not less than the sizes given in Table, the garboard strakes to be cross-bolted from side to side, with bolts not exceeding four feet six inches . Stem Scarphs are not to be less than seven-tenths the length of the Keel Scarphs, and all Scarphs are to be Tabled. Bolts.

+ The wood keel to have a vertical bolt through the keel plate between each frame. The stem, stem-post, deadwood, and remainder of the keel, to be through fistened in prevent, and deabed spaced as in the keel. The screw pointed bolts for fastening the planking when less than five inches thick to be of such form under the heads, as will sare description of metal as the bolts they are applied to, and to be in thickness equal to their diameter, and not to have less substance than three-cighths the diameter of the bolts in any part, wherever the form may be, heazegon from being preferred. All outside planks that inches broad and above, to be double fastened; eight inches-and-a-half and under ten inches, double and single fastened alternately; and under eight inches-and-a-half single fastened; and all butts to be double fastened. The bolt holes in the stringer plate are to be sunk within the surface of the planking one inch and a quarter, when dowels are intended to be used; from three-of the planksheer they need not be stringed plate are to be sunk within the policy or per property driven with oakum and a quarter, when dowels are intended to be used; from three-of the planksheer they need not be inches the planking to be enclayed with a dowelling machine and a quarter, when dowels are intended to be used; from three-of the planksheer they seems of the bottom are all cauked, purty, marrie glue, or other suitable composition under their heads, and elirection as the planking, and be driven with white lead, marrine glue, or any other approved composition. Where copper or yellow metal bolts are used, the sinking of them within the surface of the planking to the optional to the approved composition.

Lloyd's Register of Shipping, London, 24th February, 1870.

PIPING.

POSITE SHIPS



ABIGUARA PARA PARA PARA PARA PARA PARA PARA	Deadwood Keel† Stem* and Stern Post Bolts.	Keel, and	Topside, Waterway, and Planksheer Bolts.	Chain Plate Bolts.	Pintles of Rudder.	Sternp Sternp Sternp Aprol  Sternp  REEL  Regular  KREEL  Knighth
and under 100	M 7 19dm	10	16 blo	H 13	alee 2 -mi	50 and under 100
100 and under 200	1 41	10	$\frac{9}{16}$	7 8	$2\frac{1}{4}$	100 and under 200
20() and under 300	$1\frac{1}{16}$	$\frac{12}{16}$	$\frac{10}{16}$	1	$2\frac{1}{2}$	200 and under 300
300 and under 400	116	12 16	10	$1\frac{1}{8}$	$212\frac{3}{4}$	300 and under 400
400 and under 500	1 1 6	$\frac{13}{16}$	$\frac{11}{16}$	$1\frac{1}{8}$	3	400 and under 500
500 and under 600	$1\frac{1}{8}$	13 16	11/16	$1\frac{1}{8}$	$3\frac{1}{8}$	500 and under 600
600 and under 700	11801	14 16 01	$\frac{12}{16}$ S	$1\frac{1}{4}$	8 31/4	600 and under 700
700 and under 800	$1\frac{1}{8}$	14	$\frac{12}{16}$	$1\frac{1}{4}$	$3\frac{1}{2}$	700 and under 800
800 and under 900	$1\frac{3}{16}$	15	13	14	$8 \ 3\frac{1}{2}$	800 and under 900
900 and under 1000	$1\frac{3}{16}$	15	13	$1\frac{3}{8}$	$3\frac{5}{8}$	900 and under 1000
1000 and under 1200	11/4	1	14 16	$1\frac{3}{8}$	$3\frac{5}{8}$	1000 and under 1200
1200 and under 1500	$1\frac{5}{16}$	1 0	$\frac{1}{1}\frac{4}{6}$	$1\frac{3}{8}$	$8 \ 3\frac{3}{4}$	1200 and under 1500
1500 and under 2000	$1\frac{6}{16}$	$1\frac{1}{16}$	15 16	$1\frac{1}{2}$	$3\frac{7}{8}$	1500 and under 2000
2000 and under 2500	$1\frac{7}{16}$	$1\frac{2}{16}$	1	$1\frac{1}{2}$	4	2000 and under 2500
2500 and under 3000	$1\frac{8}{16}$	$1\frac{2}{16}$	1	15/8	41/8	2500 and under 3000
3000 and under 3500	$1\frac{8}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$1\frac{3}{4}$	$4\frac{1}{8}$	3000 and under 3500

Tonsunder		200	500 and under 1000	1000 and under 2000	2000 and under 3000
* Number of Bolts in Scarphs of Keels.	ngle Irona, om in 6 hips	lates and A flat of bott	8	en the end in	10

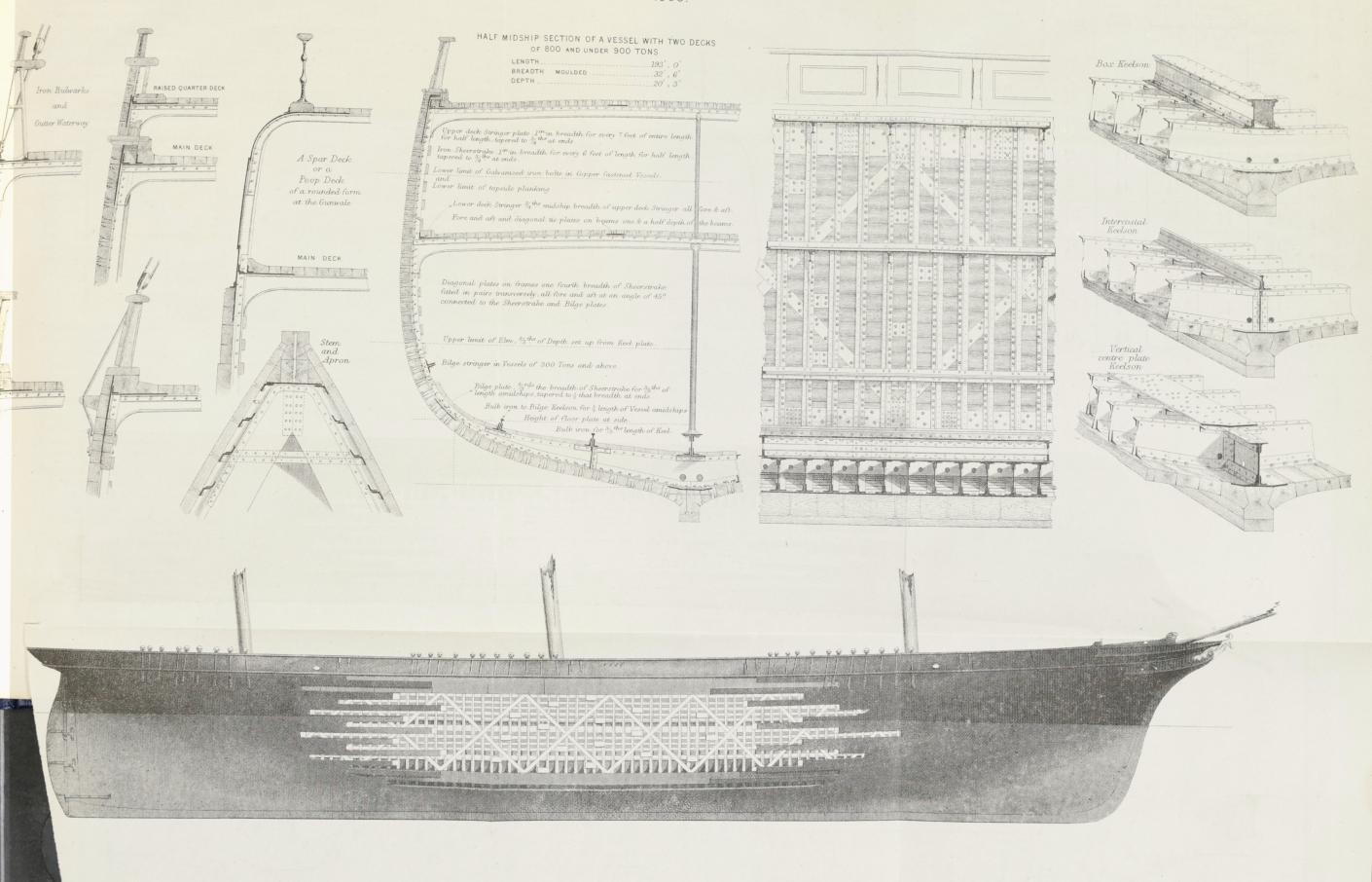
The length of the keel scarphs to be five times the mean of the siding and moulding of the keel,

33.-The bolts to be not less than the sizes given in Table, the garboard strakes to be cross-bolted from side to side, with bolts not exceeding four feet six inches . Stem Scarphs are not to be less than seven-tenths the length of the Keel Scarphs, and all Scarphs are to be Tabled. Bolts.

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Lloyd's Register of Shipping, London, 24th February, 1870.

# ILLUSTRATIONS OF THE SUGGESTIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF COMPOSITE SHIPS 1868.



Printed by Rob! Edm. Taylor. 19, Old Street, London

T.W.Lee, Sadp.

E

## WOOD SHIPS.

No. 4.—FOR.	M O	F T	HE	RI	EP(	ORT OF ORIG	HINAL	SUR	VEY.			
No. — Survey hel	d at -			- Da	ate,	first survey——	— La	st survey		18		
on the	-Mas	ter -										
Tonnage under tonnage deck ·		To	nnage	e of fo	reca	stle —	Engine	room —				
Ditto of spar dk, or awning dk.		- Gross tonnage-						Register tonnage, as a steamer, cut				
Ditto of poop, or raised or. dk		Crew space, as per rule ————					on the beam					
Ditto of houses on deck —		Re	Register tonnage, cut on beam —					o scum				
Built at — When bui	1t. —	1	— Launched —— By whom						Owners			
Port belonging to Des	stined	Vov	ace-		Tf S	Surveyed while hui	lding A	float or i	n Day D	ook		
Port belonging to — Des Length as per Section 39	Feet.	Inch	es	T	tuon	Drondth Feet, Inc	ches.   T	110at, 011	TI 11 Fe	eet. Inches.		
Length of Keel						de	1	pepth of	Hold			
			1									
Number of Decks ———			(Dep	th fro	m li	mber-strakes to unde	r side of	lower dec	k beam -	——)		
SCANTLINGS OF TIMBER.	IN SI			EQUIR			Inches.	Dime	ensions o	f Shin		
				ER RU		OUTSIDE PLANK.						
Timber and Space	Sided.	ulded	Sided.	Moul	lded.	Garboard Strakes.	In Ship. Required per Rule.		er Regist			
Floors	Sic le.	1	Sid	· ·		Garboard to Bilge	Ship.	rength-	breath-	- depth—		
1st Foothooks	Si. Middle.	Ends.		Middle.	Ends.		In	INCIDE	PLANK.	Inches.		
2nd Ditto	K	En		K	En	Bilge to Wales						
3rd Ditto						Wales	10	Limber S	trakes	ip.		
Top Timbers						Topsides	1.	Bilge Pla	nks	In Ship. Required per Rule.		
Deck Beams No { Average Space			-			Sheerstrakes		Ceiling in	Flat	In En		
Deck Beams, length amidships						Planksheers			ge to Clam			
Hold Beams No { Average Space	1								m Clamps			
Hold Beams, length amidships						Waterways-			-			
Kool						Upper Deck			m ditto			
Keel						Lower Deck		Ceiling 't	wixt Deck	S		
Scarphs of Ditto						Do. faying surface		Hold Bea	am Shelfs			
Keelsons						against Timbers		Deck Bea	m ditto	.		
Scarphs of Ditto	1		1			Upper Deck						
SIZE OF BOLTS IN FAST	TENIN	s, I	ISTIN	GUIS	HING	WHETHER COPPER	R, YELLO	W META	L, OR IRO	ON;		
						REENAILS.						
	Copp	er	Iron	Inc	hes			Coppe	r   Iron	Inches		
	or YI	I. in	Ship.	requ per H	ired			or YM	I. in Ship.	required		
Heel-Knee and Deadwood abaft	III OII	P.		ber 1	iuie.	Butt End Bolts		in Shi	2.	per Rule.		
Scarphs of Keel, No						Short Bolts in Ceili						
Keelson Bolts through Keel at						Pintles of the Rudde						
each Floor						( Wate	erway					
Bolts through Heels of Timbers						noid beam \	es					
against Deadwood						BOITS IN	f or Clam					
Frame Bolts						4	erway					
Transoms and Throats of Hooks						Deck Deam						
Arms of Hooks							s					
Through Bilge & Limber Strakes							f or Clam					
Thickstuff over Double Floors						Nails or Bolts in Fla						
	,	.7	771	-		TreenailsIncl						
TIMBERING.—The Space b	etwee	n th	e Flo	oor T	limb	pers and Lower Fo	oothooks	s is —	- Inches.			
The Space between th	e Top	Tin	abers	s is -		- Inches.						
The Floors consist of		_	The	Firs	t Fo	oothooks of ——	_					
The Second Foothook	s of -		_	The	Thi	ird Foothooks and	Top T	imbers o	f	_		
The Shifts of the first	and s	secon	nd F	ooth	ooks	are not less than						
[N.B]	When	less	than	pres	crib	ed by the Rule, sto	te how	many.]				
The rest of the Shifts	of the	Fra	me a	are -		The frame is —	- sau	ared from	n the fir	st Foot-		
hook Heads upward	s, and		- fr	ee fr	om	sap, and from then	ce down	wards th	e Frame	is —		
The —— Frames are	hook Heads upwards, and —— free from sap, and from thence downwards the Frame is —— The —— Frames are —— bolted together to the Gunwale. [N.B.—If not, state how bolted.]											
The Butts of the Timbers are — close together; their thickness not less than — of												
the entire mouldi	ng at	that	pla	ce.								
The frame is ——	chock	ed w	rith -		Bu	tt at each end of	the cho	ck. The	e Main	niece of		
The frame is —— chocked with —— Butt at each end of the chock. The Main piece of Rudder of —— Of Windlass of ——												

The Keel of The Main Keelson is and Heel from all defects.  The Stem and Stern Post of The Transoms, Knight Heads, Hawse Timbers, and Aprons, of Deadwood, of and free from all defects.  The Deck and Hold Beams of The Breasthooks of The Knees of  PLANKING OUTSIDE.—From the Keel to the Height defined in Note to Table A, or to the First Foothook Heads the Plank is From the above-named height to the Light Water Mark From the Light Water Mark to the Wales The Wales and Blackstrakes are The Topsides and Sheerstrakes					
The Spirketting and Planksheers — The Waterways { Upper Deck — Lower Deck — The Decks — State of — The Shifts of the Planking are not less than — feet — inches. [N.B.—If less than prescribed by the Rule, state whether general or partial, and if partial, in what part of the Ship.] The Planking is wrought — between, and without step-butting.  PLANKING INSIDE.—The Limber-strakes and Bilge-strakes are — The Ceiling, Lower Hold, and between Decks — Shelf Pieces and Clamps — FASTENINGS.—To Hold Beams — Deck Beams — Number of Breasthooks — Pointers — Crutches — Butt End Bolts are of — in the Bottom — Bolts in each Butt End through and clenched.  Bilge and Limber Strakes — bolted through and clenched.					
Treenails of — How made — Thickstuff over Double Floors — bolted through and clenched. General Quality of Workmanship — We certify that the above is a correct description of the several particulars therein given.  Builder's Signature — Surveyor's Signature — Her Masts, Yards, &c. are in — condition, and sufficient in size and length.					
No. She has Sails.  Cables, &c.					
* State Machine where Tested, and Name of Superintendent.  Her standing and running Rigging — sufficient in size and — in quality.  She has — Long Boat and — The present state of the Windlass is —  Capstan — and Rudder — Pumps —  Scuppers, &c.—What arrangements are there beyond the scuppers on deck, for clearing upper deck of water, in case of a sea coming on board?  Cargo Hatchways.—How formed? — State size — If of extraordinary size, state how framed and secured? — What arrangements for shifting beams? —  Hatches, themselves, whether strong and efficient? — Main Hatchways.—State size —					
Order for Special Survey, No. — Date — veys held while 2nd. When the Beams are put in, &c. — Order for Ordinary Survey, No. — Date — Section 35.  Present condition of Caulking of Bottom — Deck — and Waterways — If Sheathed, Doubled, Felted, Coppered, or Yellow Metalled — When last done — I am of opinion this Vessel should be classed — The amount of the Entry Fee £ : is received by me, Special £ : Certificate : : Committee's Minute — 18— Character assigned —					

## No. 5.—IRON SHIPS.

No. — Survey h	eld a	it —		_	Da	ate, first survey-	Last surv	ey-			18—
on the — Fonnage under tonnage deck—	Mast	ter —		-		DECKED VESSELS.					
Ditto of spar deck, or awning dec						dth	THREE DECK Half moulded bread	ED	VES	SEL	S.
Ditto of poop or raised quarter de	poop or raised quarter deck Depth from uppe			r part of keel)	Total depth if the	AA O	m m	ora)			
Ditto of houses on deck -		Girth of half mids				deck beams (	decks Total girth of ha			}	
Ditto of forecastle		- I	er ru	le)		smp frame (as	frame	lf m	nidsh	ip }	
Gross tonnage						- management of the state of					
Crew space, as per rule		1st Number Length					3rd Number				
Register tonnage, cut on beam-		-					Length				
Engine-room —		- 2nd	Nun	ber						-	
Register tonnage, as a steamer cut	on th	e				Ton Tiumber					
	1,	-   Dej	otns t	o len	gth		Property to leave 17				
Built at When buil	It —	1	Launched — By whom built — Owners — yage — If Surveyed while Building, Afloat, or in Dry Dock—								
Port belonging to—— Des	stine	dVoy	age-		-If S	Surveyed while Bui	lding, Afloat, or in	ı Dı	vD	ock-	
Length on deel ag nor rule	Feet.	Inche	s.			1	Horse,		0		-
Moulded Breadth							TOTSE.				
Depths from top of Floors to Upper and Main Deck Beams,			P	ower	of E	igines	No. of Deck	8 -			
as per rule			1				No. of Tiers	s of I	Beam	18 —	
Dimensions of Ship per Register, le	ength-			bread	ith—	depth					
Keel, if Bar Iron, depth and	Inc	hes in	1	Inch	es			1		Reg	uired
thickness	S	hip.		Requi				In S	Ship.	per	Rule.
,, if Centre Through Plate, depth and thickness			p	er R	ule.						
Stem, if Bar Iron, moulding and						Flat Keel Plates, bre	adth and thickness	Inches	16ths.	Inches,	16ths.
Stern post for Rudden moulding						Flates in Garboard	Strakes, breadth and	Inc	161	In	16t
Stern-post for Rudder, moulding and thickness						Divid from Garboar	d to unner nert of		-		
for Propeller						Bilges	Bilge, or increased		-		
Distance of Frames from moulding-edge to moulding-edge,			(C	lass	)	,, of doubling at	Bilge, or increased				
all fore and aft	In	Ship.	F	Requi	red	Irom unner no	d length applied rt of Bilge to lower				
Frames, Size of Angle Iron, for	,			er Ru		edge of sheer	strakerake, breadth and				
3 length, amidships	80	80 .	00	1 8	1 .	thickness	rake, breadth and				
Reversed Frames, size of Angle Iron	Inches.	Inches.	Inches.	Inches.	16ths.	of doubling s	at Sheerstroke and				
Floors, depth and thickness of	In	In 16t	In	In	16t	length applie	d				
Floor Plate at mid line for						) Hom Main to	Upper or Spar Deck				
half the length amidships at the ends	.  -					by Opper or Span	r Deck Sheerstrake				
,, Do. do. at bilge keelson						Dreadth and	thickness				
Beams, Upper, Spar, or Awning			-			Butt Straps to outside thickness					
Deck (No. ),											
single or double						Shifts of Plating, and Gunwale Plate on end					
Angle Iron, Plate or Tee Bulb Iron											
,, single or double						Angle Trop on ditte					
Angle Iron on						Angle Iron on ditto Tie Plates (fore and	aft), outside Hatch-				
upper edge											
,, Main or Middle Deck		1				Diagonal Tie Plates pairs,					
(No. ), single or double Angle						Flanksheer material	and coontline				
Iron, Plate or						Waterways, ditto Flat of Deck, ditto	ditto				
Tee Bulb Iron						How fastened to Bean	ditto				
,, ,, single or double Angle Iron on						How fastened to Beam Stringer Plate on ends	s of Main or Middle				
upper edge						Deck Deams,	breadth and thick-				
,, average space ,, Lower Deck, Hold, or						(To the Stainage DI-					
Orlop (No. )						(Is the Stringer Plat side plating?)	e attached to the out-				
single or double		-	1			Angle Trong on ditto	No 1				
Angle Iron, Plate or Tee Bulb Iron						Tie Plates, outside Ha	tchwave				
,, ,, single or double				A.A.		Diagonal Tie Plates pairs, )	on Beams (No. of				
Angle Iron on											
upper edge											
Keelson, centre line, single or						How fastened to Beam Stringer Plates on en	da of Tomas Dal				
double plate, box, or						Hold, or Orlon	Beams	1			
intercostal, size of Plates						(Is the Stringer Plate	e attached to the out				
,, Bulb Plate to Intercostal						side plating?)					
,, Size of Angle Irons						Angle Irons on ditto (	No. )				
,, Side Intercostal Keel-	100					Duringer or Tie Plates	Outside Hatchman				
son, size of Plates						Flat of Deck					
,, Angle Irons on Tops of Floors	-					material			-		
,, Bilge Keelson, Bulb Iron											
Angle Irons				1		Clamps or Spirketting Main piece of Rudder,	diameter at head				
,, Side stringers (No. ) size of Angle Iron						" "	,, at heel				
	,		1	1		1.	,		-		

(Can the rudder be unshipped affoat?———)
Bulkheads, No.——— Thickness of—————
Ditto, Height up————
Ditto, How secured to the sides of the ship————————————————————————————————————
Ditto, Size of Vertical Angle Irons,————and their distance apart,————
Ditto, Are the outside Plates doubled two spaces of Frames in length?————————————————————————————————————
Transoms, material———or, if none, in what manner compensated for.
Knight-heads————— Hawse Timbers—————
Windlass———————————————————————————————————
The Frames extend in one length from to riveted through plates
with ( in.) rivets, about ( ) apart.
The reverse angle irons on the floors extend across the middle line ———
On all the frames and to———
Keelsons. Are the various lengths of plates and angle irons properly connected? — And are their butts properly shifted?
Plates, Garboard, double or riveted to keel, double or at upper edge, with
rivets ( in.) diameter, averaging ( ins.) from centre to centre.
" edges from Garboards to upper part of bilge, worked clencher, double or single riveted;
with rivets ( in.) diameter, averaging ( ins.) from centre to centre.
" butts from Keel to turn of Bilge, worked carvel with butt straps to strakes ( )
thick, treble, double or single riveted; with rivets ( in.) diameter, averaging ( ins.)
from centre to centre. Do the butt straps lap over and rivet through the lands of the
strakes above or below?———
" edges from Bilge to Main Sheerstrake, worked carvel with a lining piece ( ) thick, or
clencher, double or single riveted; with rivets ( in.) diameter, averaging ( ins.)
from centre to centre.
" edges of Sheerstrake, main, double or single riveted. Upper double or single riveted.
At upper edge ————. At lower edge ———
" butts from Bilge to Main Sheerstrake, worked carvel with butt straps ( ) thick,
double or single riveted; with rivets ( in.) diameter, averaging ( ins.) from
centre to centre.
,, butts of Main Sheerstrake, double or treble riveted. Butts of upper or Spar Sheerstrake,
double or treble riveted.
" breadth of laps in double riveting ( ). Breadth of laps in single riveting
( ).
Butt Straps of Keelsons, Stringer and Tie Plates, treble, double, or single riveted?
Planksheer, how secured to the plating of the sides
Planksheer, how secured to the plating of the sides Waterway ,, ,, planksheer and to the beams  *Explain by sketch, if necessary.*
Beams of the various Decks, how secured to the sides?
No. of breasthooks — crutches —

Outside Plating, &c.?————  Manufacturer's Name or Trade Mark————	Keelsons, Tie and Stringer Plates,
We certify that the above is a correct description of the se	everal particulars therein given.
	Builder's Signature.
· · · · · · · · · · · · · · · · · · ·	Surveyor's Signature.
Workmanship.—Are the butts of plating planed or otherwise	e fitted?
without requiring any making good of deficiencies?	se together throughout their length
Do the fillings between the ribs and plates fill in solid with lengths of various thicknesses?———	single pieces, or are they in short
Do the holes for riveting plate to frames, butt straps, or to each other? ————————————————————————————————————	plate to plate, &c., conform well and sufficiently counter sunk in the
Are there any rivets which either break into or have been put plating?———	t through the seams or butts of the
Her Masts, Bowsprit, Yards, &c. are in ———————————————————————————————————	and sufficient in size and land
by a Sketch, showing how the lower Masts and Bowsprit a Plates and Angle Irons, mode of riveting, quality of Matname.)	ngle Irons, &c., and further explain re constructed, showing the number of erials, and if stamped with Maker's
State also Length and Diameter of Lower Masts and Bowsprit	
No. Sails. Cables, &c. Start of Sails, Chain*	ANCHORS, Scool, I get a graph of the requirement of
Fore Top Sails, Hempen Stream Cable Hawser	Bowers*
Sails, Towlines	Stream
Main Top Sails, and All of ——quality.	Kedges
* State Machine where Tested, and Name of Sur Her Standing and Running Rigging — sufficient in siz	perintendent,
Die has — Long Boat and —	
The present State of the Windlass is — Capstan — Pumps — —	— and Rudder ———
ENGINE ROOM SKYLIGHTS.—How constructed?—— How What arrangements are there for deadlights in such for ba	v secured in ordinary weather?
COAL BUNKER OPENINGS.—How constructed?——— How	v are lids secured?——— How
Scuppers, &c What arrangements are there beyond the sc	uppers on deck, for clearing upper
deck of water, in case of a sea coming on board?	

	- State size ————————————————————————————————————
state how framed and secured?	What arrangement for shifting beams?
HATCHES, themselves, whether strong and size? —————	efficient?——— MAIN HATCHWAYS.—State
No. — Dates of Surveys held order for Ordinary Surveys No. — Surveys held while building, as per Section Date — 18.	On the several parts of the frame, when in place, and before the plating was wrought ————————————————————————————————————
GENERAL REMARKS,—	
In what manner are the surfaces preserved from I am of opinion this vessel should be classed —  The amount of the Entry Fee£  Travelling Expenses Special (if any)£  Certificate  Committee's Minute — 18 —  Character assigned — 18	: : is received by me,

## No. 6.—FORM OF REPORT OF ANNUAL SURVEY.

No. — Survey h	eld at —	— Date —	18	— on the	——— Master —	—— Tonnage
——— Built at ——	- When	huilt	By wh	om built	0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Port belonging to —	—— Destin	ned Voyage	If	Surveyed A	Afloat or in Dry I	ock ——
上	ast Survey,	No. ——	- Port of -	Cla	ssed ——	
Present condition of						
Decks Waterways Comings Upper Deck Beams and Fas Lower Deck Beams and Fas Planksheers Sheerstrakes Topsides Wales Plank (Bottom) and Count Engine Room Skyli	ttenings ttenings ter Caulking ights Cargo and Opinion,	Breasthooks Transoms, P Timbers of the Ditto Keelsons Clamps and Ceiling Rudder Copper of Bottom, Coal Bund Main Hatch	When put Deck, and W aker, Openin	Crutches the openings er places ton Vaterways — gs, Lids, &c	e. — Scupper	certaineds
Committee's Minute Character assigned -	1	8			Certificate	(if required)
No. 7.—	-FORM	OF CER	RTIFICA	TE OF	CHARACTER	v.
Lloyd	l's Regis	ster of B	ritish an	nd Foreig	gn Shipping.	
	1	ESTABL	ISHED	1834.		
No. —	PON SHIER IN				, White Lion Cou	rt, Cornhill,
These are	to Certi	ifp. That	the		- of	
Mas	ter, —	Tons	s, bound to	0	o be, on the	
and that she has been (	CLASSED :	and entered	in the RE	GISTER 1	BOOK of this So	ciety with the
Charge				Witnes	s my hand,	· Chairman.
distribution	, Se	cretary.				Citati noute.

## ENGINEER'S CERTIFICATE.

The following is a tru	e Account of the	Particulars of the	Machinery a	and Boilers :-
------------------------	------------------	--------------------	-------------	----------------

	er Direct Acting or Geared; Inverted, Horizontal, Diagonal, is; No. of Cylinders, &c.
ENGINES, maker of	Bilge Pumps, No. ( ) and size
,, age of	Feed ,, No. ( ) and size
,, last time taken out	Spare Gear, if usual quantity on board Vessel
,, present condition	
Diameter of Cylinder	Fuel, where stowed
Length of Stroke	,, space between Coal Bunkers }
No. per Minute of Engines	" what quantity is space provided
" of Screw	Donkey Engine and Boiler
Estimated Power	" if Fitted in Engine Room or )
Effective December	on Deck
D:	1 1111
Pitch of Screw	
No. of Blades (or Floats)	,, is hose of sufficient length to
Description of Screw (or Floats)	reach every part of the vessel)
Holding down Bolts, size	No. ( ) and condition of hand
" present condition	pumps, if fitted in Engine Room \( \)
superheating apparatus; if Fired athwarts!  BOILER, Maker of	.; if Tubular, or Flues; No. of Furnaces; if Fitted with hips, or from fore or after end of Boiler, &c.  Can each Boiler be used separately  What clear space between top of Boiler and Woodwork  What clear space between Funnel and Woodwork  Are Engine and Boiler Keelsons well connected fore and aft  Tunnel, thickness of plating door on Engine Bulkhead
Port-	-Day of18
hereby certify that the	he whole of the above Machinery and Boilers of the
Iron (or Wood) Screw (or Paddle) Steam Vessel	belonging to
whereof — is Master	——————————————————————————————————————
carefully inspected and examined by	ot and
—— found the same, at this date, in good order	and safe working condition.
	Marine Engineers

#### CHAIN CABLES.

TESTING TO BREAKING STRAIN.

On the 23rd March, 1871, the Committee passed a Resolution to the effect "that with a view to obviate inconvenience to Shipowners and others in arranging for the equipment of Vessels, the Committee have determined that the Certificates of test of all Chains proved in accordance with the Rules in force at the time of testing shall be recognized in the Classification of a vessel."

NOTICE IS HEREBY GIVEN, that by a Resolution passed this day, the foregoing order has been rescinded, and the following substituted in lieu thereof, viz.:—

"That Chains tested up to the 1st July, 1872, under the existing Act at a Machine recognized by the Committee, will be accepted for any Vessel built or contracted for prior to the new Act coming into force on the 1st July, 1872; and that all vessels built or contracted for after the 30th June, 1872, will be required to be supplied with Chains tested in conformity with the requirements of the New Act."

By order of the Committee,

GEORGE B. SEYFANG.

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C., 14th December, 1871.

No. 293.

## LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

## CHAIN CABLES.

TESTING TO BREAKING STRAIN.

With reference to the proposed postponement of the operation of the Chain Cables and Anchors Act, 1871, the Committee of this Society HEREBY GIVE NOTICE, that they will adhere to the Resolution embodied in Notice No. 285, dated 14th December last, viz.:—

"That Chains tested up to the 1st July, 1872, under the existing Act at a Machine recognized by the Committee, will be accepted for any Vessel built, commenced, or contracted for *prior* to the New Act coming into force on the 1st July, 1872; and that all Vessels built, commenced, or contracted for *after* the 30th June, 1872, will be required to be supplied with Chains tested in conformity with the requirements of the New Act."

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C., 16th May, 1872.

CLOSING OF LLOYD'S PROVING HOUSE FOR TESTING ANCHORS AND CHAIN CABLES, POPLAR.

NOTICE IS HEREBY GIVEN, that in pursuance of a resolution passed this day by the Committee the above Works will be CLOSED on and after Monday, the 25th March, next.

By Order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C. 22nd February, 1872.

No. 292.

## LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

CLOSING OF LLOYD'S PROVING HOUSE FOR TESTING ANCHORS AND CHAIN CABLES, POPLAR.

With reference to Notice No. 288, announcing the Closing of the above Works:—

NOTICE IS HEREBY GIVEN, that in pursuance of a Resolution passed this day by the Committee, possession of the premises will be given up on the 24th June next.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, E.C., 18th April, 1872.

## EXPIRATION OF CHARACTER OF SHIPS CLASSED A, OR A IN RED.

NOTICE IS HEREBY GIVEN, that in pursuance of the Rules, Section 59 (as set forth below), and of a Resolution passed this day by the Committee of Lloyd's Register of British and Foreign Shipping:—

"All Ships classed A for a term of years, will, at the expiration of such term (or so soon after as may be practicable) have the word 'expired' inserted against their names in the Register Book, and if not surveyed and re-classed prior to the reprinting of the Register Book in June next, will appear therein without character."

The foregoing Resolution will likewise apply to Ships classed A in Red, whose period of exemption from special re-survey will terminate on the 31st December.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C., 9th November, 1871.

#### EXTRACT FROM THE RULES, SECTION 59.

- "At the termination of the several periods assigned to ships for remaining on the character A, or A in Red, they will have the word 'expired' inserted against them; and if not surveyed prior to the Reprinting of the Register Book, they will appear therein without any character."\*
- \* The terms of years assigned to ships on the character A, launched previously to the 1st July, 1859, also of ships launched during the first six months of the years 1860, 1861, 1862, and 1863, will expire on the 31st December of the last year of the periods assigned to them respectively.

The terms assigned to ships launched during the *last* six months of the years 1859, 1860, 1861, and 1862, will expire on the 30th June next after the last year of the periods assigned to them respectively.

In the case of ships launched on and after the 1st July, 1863, the period originally assigned to them on the A 1 character, will in every case *date from the month* in which the vessel may be launched, and will expire at the end of the corresponding month in the year at which the period assigned terminates.

## SHIPS CLASSED A IN RED, OR Æ.

The Rules, Sections 60 and 61, requiring that ships classed A in Red, or Æ, shall be surveyed annually, or on their return from every foreign voyage:—

NOTICE IS HEREBY GIVEN, that in accordance with the above Rules, and in pursuance of a Resolution passed this day by the Committee, the Characters of Ships classed A in Red, or Æ, which shall not have been surveyed since the year 1869, will be omitted in reprinting the Register Book (in June next) for the year 1872-73.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C., 9th November, 1871.

N.B.—In the case of Ships which it shall be made to appear, by letter addressed to the Secretary, have not been in any Port in the United Kingdom since 1869, the above Resolution will not be applied.

## CIRCULAR TO SURVEYORS.

# LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

SIR,

No. 2, White Lion Court, Cornhill, London, E.C., 30th November, 1871.

It having been reported to the Committee, that Steam Vessels are now commonly built with long Raised Quarter Decks, or Raised Decks, which are butted against the after Bulkhead of the Engine Room, and that others have Raised Decks with the Engine Room underneath, and that the stringer plates of the respective tiers of beams in such cases have not generally sufficient shift beyond each other at the break of the decks or tiers of beams, to insure continuous strength, and that in consequence, vessels of this description have been showing signs of weakness;—

I am instructed to express the Committee's desire that you will direct your special attention to the shifts given to stringer plates over each other, and to require them to be well shifted, either before or abaft the bulkhead at the break of the deck; and in addition, it is considered that the main sheerstrake should be doubled, or increased in thickness, also that the side plating of the Raised Quarter Deck, where it is attached to the Engine House, should be increased in thickness, and that this increase should be extended a reasonable distance before and abaft the break of the Raised Deck; and further, that the Butt Straps should be of increased thickness, and be treble riveted.

In some instances a continuous tie has been obtained between the main deck stringer plate and the Raised Quarter Deck stringer plate, by the introduction of a vertical plate to the outer edge of the Raised Quarter Deck stringer plate, which has been attached to the main deck stringer plate which under-runs it, thus forming, with the outside plating and stringer plates, a box connection, but this of itself, it is thought, does not give sufficient strength.

It is also considered necessary that where vessels have long poops, the main sheerstrake and the main deck stringer plate should, at the termination of the poop, be either increased in thickness, or else be doubled for a length of from twenty to thirty feet.

In reporting vessels of this description, you will state what means have been adopted to give the necessary strength at the parts alluded to.

I am, Sir,

Your obedient Servant,

GEORGE B. SEYFANG,

Secretary.

#### RULES AND REGULATIONS.

NOTICE IS HEREBY GIVEN, that in pursuance of Resolutions passed this day by the Committee, amendments have been made in the Rules of the Society as follows, viz.:—

#### TREENAILS, SECTION 46.

The requirement that Treenails are to be "of a description equal to the best material through which they pass" has been modified by the addition of a footnote, to the effect, that parties desiring a modification of this requirement must make special application to the Committee in each case.

#### TABLE A FOR WOODS.

JARRAH TIMBER to be entered in Table A, in line No. 3, thus rating it with Cuba Sabicu, Pencil Cedar, &c.

ROCK MAPLE to be entered in Table A, in line No. 12, thus rating it with Foreign Ash.

#### STEAM POWER IN SHIPS.

STEAM POWER IN SHIPS.—The entry of "A.P." (Auxiliary Power) in the Register Book to be discontinued, and the nominal Horse Power (H.P.) to be inserted in lieu thereof.

#### SALTING OF SHIPS, SECTION 37.

The Rule in respect to the Salting of Ships has been amended as regards the Salting of the keelson, and the Rule will now stand as follows, viz.:—

"One year will be added to the term of classification to which a ship may otherwise be entitled, provided that during her construction she be salted as under, viz.:—

"The spaces between the transoms and between the timbers of the frame to be filled with salt at each end of the vessel for one-fifth her length, from the deadwood to the gunwale, and amidships from the upper part of the bilges to the gunwale. For the purpose of retaining the salt between the timbers, stops are to be introduced immediately above all the air courses, and at the upper part of the bilges.

"The keelson is also to be cased in and salted all fore and aft. In the case, however, of vessels entitled in other respects, from their wood materials, to a class not higher than 10 A where the keelson is composed of materials named in lines Nos. 1 and 2 of Table A, it will not be necessary to salt the keelson, except at the ends.

"The beams on which the weather-deck is to be laid, if salted, are to have a groove gouged on their upper side, except at their ends; the groove to be in width not less than one-fourth the siding of the beam, and one inch in depth; and to be filled with salt as the deck is being laid; but if not so salted, the beams, when of wood of the nine years' grade and under, of all ships to which a year has been or may be granted for 'Salting' must, on the occasion of Half-time Survey, be exposed for examination by the removal of deck planking to the extent of one strake all fore and aft at each side of the ship, or to the satisfaction of the Surveyor.

"The state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time and other Special Surveys, and, if necessary, the salt is to be renewed."

Mem: The foregoing Resolution is not to apply to ships built entirely of Teak.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No 2, White Lion Court, Cornhill, London, E.C. 30th November, 1871.

#### FOREIGN-BUILT SHIPS.

No. 2, White Lion Court, Cornhill, London, E.C. 30th November, 1871.

SIR,

I am directed to acquaint you, for your information and guidance, that the Committee have modified the requirements set forth in pages 43 and 44 of the Rules, for the Survey for Classification of Foreign Built Ships not constructed in accordance with the Rules of the Society, and that the Regulation in question will now stand as shown on the other side.

I am, Sir,

Your obedient Servant,

GEORGE B. SEYFANG,

Secretary.

P.S.—I request you will make the above known to any parties in your district interested in the matter.

#### FOREIGN BUILT SHIPS.

It having been deemed desirable that *Foreign Built Ships*, which have not been constructed in accordance with the Rules of the Society, should nevertheless be entered in the Register Book with a character of efficiency if their condition be such as to entitle them thereto, the following Regulations have been adopted for their Survey and Classification, viz.:—

Foreign Built Ships which have not been constructed in accordance with the Rules, and have not been surveyed by the Surveyors to this Society while building, for which the Owners are desirous of a character of condition or efficiency for sea-going purposes, will be surveyed for entry in the Register Book on application being made to the Committee in writing, stating the name of the Vessel (and if at any time she had any other name such is to be inserted in the Application); likewise where and when she was built, and her length, breadth, depth, and tonnage (whether British or Foreign).

The Committee will then direct a special survey to be held by two Surveyors, to be appointed in every instance by the Committee, one of whom at least shall be an exclusive officer of the Society, and the ship submitted to a compliance with the undermentioned requisitions of survey or surveys, viz.:—

#### SURVEY No. 1.

If the ship is less than four years old, she must be either placed in dry dock or laid on blocks upon ways, so that the keel and bottom may be seen and properly examined.

The hold to be cleared, and proper stages to be made both inside and outside.

All air-courses, and the limbers to be cleared.

Bolts and treenails to be driven out at different parts of the ship, and in sufficient numbers to enable the Surveyors to ascertain their condition; the condition of the plank and timbers in the treenail holes also to be ascertained.

A listing of not less than four inches wide, and equal to one fifth of the length of the ship on each side to be cut out below each set of clamps or shelves in such parts as the Surveyors may require, sufficient to enable them to ascertain the size and condition of the frame.

The condition of the oakum and caulking to be ascertained. The windlass to be unhung, and wood linings stripped.

The Cables and general equipment to be attended to as prescribed in Sections 71 to 76.

The Surveyors must then examine and report upon the ship, as to the state of the timbers of the frame (where examined), planking inside and outside, decks, waterways, beams, knees, keel, keelsons, stem, apron, hawse timbers, knightheads, breasthooks, transoms, rudder, and windlass, the sheer and general form of the ship, particulars of materials and scantlings, so far as they can be ascertained, and spacing of timbers and beams, thickness and shifting of plank, mode of fastening, and the sizes and condition of the bolts and treenails.

When the ship is more than four years old, she must, notwithstanding she may have undergone the

foregoing Survey, be subjected to the requirements of Survey No. 2.

#### SURVEY No. 2.

If the ship is four or more years old, in addition to the foregoing Survey, she must be scraped bright from the light water-mark upwards, including the planksheers and waterways; the beam-ends must be examined by boring, and a listing of not less than four inches wide must be cut fore and aft below each set of clamps or shelves, and at the bilges at the discretion of the Surveyor, and a short listing outside at each buttock.

This must apply to all ships of four or more years old, whether they have had the short listings previously

cut or not.

If after such examination all repairs are done to the satisfaction of the Surveyors, so as to enable them to make a favourable Report, a class of efficiency will be granted by the Committee, and entered in the Register Book, which class will be retained for a period not exceeding four years, subject to annual Survey,—unless it shall be made appear by the Owner that the ship has not been in any port during that period, where the Society has a Surveyor.

These Surveys will be noted in the Register Book, thus (S.S.No.1-71), (S.S.No.2-71), indicating the

special survey and date thereof.

There will be three designations of condition or character, distinguished thus:-

2 F

1 F denotes ships which are found on survey to be of a superior description, fit for the conveyance of dry and perishable goods to and from all parts of the world.

2 F denotes ships which, although not equal to the foregoing, are nevertheless found on survey to be in a

good and efficient condition, and fit for the conveyance of dry and perishable goods, on shorter voyages. 3 F denotes ships which shall be found on survey fit for the conveyance of cargoes not in their nature subject to sea damage.

It is to be distinctly understood that the foregoing regulations will be confined in their application to

Foreign Built Ships.

These classes can be repeatedly continued for a period of four years, by the ship being subjected to the

requirements of Survey No. 2, and the Annual Surveys.

To entitle the ships to fig. 1, they must be supplied with stores in accordance with Table 22, attached to the Rules.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, E.C. 30th November, 1871.

## ANCHORS AND CABLES.

With reference to the requirement of the Committee that "all Anchors and Chains supplied to ships claiming to be classed with the figure 1 in the Register Book of this Society, must be tested as prescribed in Table 22 attached to the Rules, at a machine under the control and superintendence of some responsible public body, so as to enable it to be recognized as a public machine,"

NOTICE IS HEREBY GIVEN, that the following Chain and Anchor Testing Machines have been approved and recognized by the Committee as public machines:—

#### LONDON.

#### LIVERPOOL.

Mersey Docks and Harbour Board's Chain and Anchor Testing Machines; Superintendents, Mr. W. Macdonald and Mr. James Haslam.

#### TYNE.

Lloyd's Tyne Public Chain and Anchor Proving House (at Low Walker); Superintendent, Mr. Robert Burrell.

#### SUNDERLAND.

#### TIPTON.

Tipton Public Proving Machine, erected by the Staffordshire Public Chain and Anchor Testing Company (Limited); Superintendent, Mr. Samuel Tregenna.

#### NETHERTON.

Netherton Public Proving Machine, erected by the Staffordshire Public Chain and Anchor Testing Company (Limited); Superintendent, Mr. Matthew Kelly Reade.

#### JERSEY.

Jersey Mutual Insurance Company's Machine; Superintendent, Mr. John M'Allen.

#### BRISTOL.

Bristol Public Chain and Anchor Testing Machine (Marsh Street, Bristol); Superintendent, Mr. John Sanders.

#### CHESTER.

Chester Public Proving Machine (at Saltney, near Chester), erected by the Cambrian Public Chain and Anchor Testing Company (Limited); Superintendent, Mr. Andrew S. Jack.

#### GLASGOW.

The Glasgow Anchor and Chain Cable Testing House; Superintendent, Mr. Wm. Taylor.

#### CARDIFF.

Public Chain and Anchor Testing Machine, erected by the Trustees to the Marquis of Bute; Superintendent, Mr. G. W. Penn.

By order of the Committee,

GEORGE B. SEYFANG,

Secretary.

No. 2, White Lion Court, Cornhill, London, E.C.

MEM.—In cases where Ships have been supplied with Anchors and Cables which have been tested at a *Public Machine*, the fact will be noted in the Register Book thus, A.&c.P., signifying that the Anchors and Chains have been so proved.

WYMAN AND SONS, PRINTERS,
GREAT QUEEN STREET, LINCOLN'S INN FIELDS,
LONDON, W.C.





